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THE SUPERIORITY OF DISTRIBUTED PRACTICE IN DRILL IN ARITHMETIC

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DRILL materials for use in arithmetic can be described. If the terms used in the descriptions are adequate, true pictures of the arithmetical experiences which they portray will be forthcoming. If the descriptions are inadequate, distorted or useless pictures of the arithmetical experiences which they provide will be the results. Some of the futile terms used in describing drill materials are "good," "enough," "the product of years of experience," "the same as found in competing material," "excellent," "surely enough," "twenty pages of material," and the like.

In contrast to such loose and vague descriptions, it is possible to use a set of specifications for drill construction and for drill selection. The following list of specifications, while not perfectly objective and certainly not complete, at least seems to direct one away from loose thinking and to lead toward precise or scientific thinking. Space forbids an exhaustive description of these specifications. Their general nature will be evident from the context.[1]

Specification I—

1. Drill should be upon the entire process, for example, in the addition of whole numbers all the combinations should be practiced and the harder combinations should obviously receive especial attention.
2. All the computational difficulties should appear and "interference factors" as far as they are now known should be stressed.

[1] For a more extended discussion of this topic see, *Third Yearbook*, Department of Superintendence, pp. 63 ff. (Washington, D. C., National Education Association, 1925) For a study of the drill provisions in typical textbooks and objective appraisals of their worth see, *A Method for Rating the Drill Provisions in Arithmetic Textbooks*, O. S. Lutes and Agnes Samuelson. Obtainable from University Editor, State University of Iowa, Iowa City, Iowa.

Specification II—

1. The material should be organized in small units so that it can be worked upon frequently. This specification is especially important for material used to maintain skills rather than to create them.

Specification III—

1. A unit of drill material should possess examples calling for the use of many processes.
2. Mixed drills are preferable to material using a single process with the exception of drill which is given for the purpose of building a new skill directly after instruction in it.

Specification IV—

1. Drills should have time limits not for the purpose of developing unusual speed but for the location of excessive slowness on the part of certain pupils, symptomatic of inadequate mastery of unit-skills involved.

Specification V—

1. Drill units should have standards of accuracy or performance.
2. These should, and can, be so constructed that they make allowance for the important facts of individual differences.
3. Some types of performance standards are thoroughly vicious, other types are essential to the proper organization of drill material.
4. Motivation provided by proper standards is noteworthy.

Specification VI—

1. Examples within a drill unit should be arranged in order of difficulty. This seems self-evident. This specification is not universally observed because of the time and expense involved in obtaining the facts.

Specification VII—

1. Material should be organized to facilitate possibilities of exact diagnosis for the individual as well as for the class.

Few competent workers in arithmetic would be disposed to challenge the importance of any one of the specifications just listed, and certainly only a handful would violently oppose them. Any prolonged consideration of this list would almost surely eventuate in the demand for devices whereby the specifications could be worked into actual classroom practice, an inquiry into the exact meaning of each item, a question of the possible desirability of including still other specifications, and the examination of the experimental evidence which supports them.

Each one of the specifications given, and probably several others, deserve explanation, discussion, and illustration. Also, each one should be supported by adequate experimental data in addition to verbal defense. The remainder of this paper concerns itself with the presentation of data to support the first of these specifications.

WHAT IS MEANT BY DISTRIBUTED DRILL?

Specification I states that drill material should be upon the entire process. This is interpreted as meaning that all number combinations used in a process should be present in drill upon that process. Several considerations immediately arise.

1. How many combinations are there in each of the four fundamental processes which use whole numbers only?

In addition there are one hundred primary or simple combinations. The older count of forty-five assumed that $7 + 9$ was the psychological equivalent of $9 + 7$. This does not appear to be true. So, in building drill for addition one hundred combinations should appear. We neglect here a consideration of higher-decade addition because our experimental data bear directly on the primary combinations. Similarly there are one hundred primary subtraction, one hundred primary multiplication, and ninety primary division combinations commonly taught in the lower grades.

2. Which combinations are the harder?

If we had the "difficulty rating" of each combination, we would probably assume that the harder the combination the more often it should be practiced. Clapp's splendid investigations have produced ratings in difficulty for the number combinations. But, the ratings of the difficulty of the combinations as reported by Clapp are the result of two factors, namely, the difficulty inherent in the combinations themselves, and the effect produced by unknown, but probably unequal, amounts of practice which Clapp's experimental group had received on the various combinations previous to the investigation. How much of the difficulty rating of a combination as reported by Clapp is due to inherent difficulty and how much is due to faulty and uneven practice on the combinations is unknown. Should we now use drill material in which frequency of practice on the individual combinations is in proportion to the difficulty of the combinations as implied by Clapp's ratings, we should probably find that some combinations now easy would then become hard, and those now reported hard would then become easy.

Only a carefully guarded experiment with children from their start with numbers with all practice carefully controlled for several factors will reveal the inherent difficulty of the combination, and it is the inherent difficulty which is the crucial fact. Pending the availability of data from this type of investigation, the author sus-

pects that the charts given in Figures 1[1] and 2 approximate the truth relative to the ratings of the difficulty of the number combinations.

The theory underlying a proper distribution of practice on the number combinations is that all combinations should be practiced, but that combinations which are inherently harder should be practiced oftener. The practical questions, which immediately arise, are:

	0	1	2	3	4	5	6	7	8	9
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9

Figure 1. Difficulty Ratings of the Number Combinations for Addition[1]

Note.—The group of combinations outlined by the heavy lines are the more difficult combinations.

How often should the easier combinations be practiced? and How much oftener should the harder ones be practiced?

At this point a common contention may be raised, namely, that there will be sufficient transfer between number combinations to

[1] Similar charts showing the number combinations in multiplication and division may be arranged. The division combinations considered here are the multiplication combinations which are concealed in division. Thus in the division example $4\overline{)8}$, the combination is 2×4.

render careful distribution of practice quite unnecessary. For example, is it not reasonable to suppose that if sufficient practice is given on such combinations as $7+7$, $7+8$, $8+8$, $8+6$, and $8+9$ that the combination $8+7$ will take care of itself? This means, in practice, that all the combinations will be mastered by giving reasonable amounts of drill in which the combinations have succeeded each other in the order dictated by reasonably sagacious guess work.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
0	0-0	1-0	2-0	3-0	4-0	5-0	6-0	7-0	8-0	9-0									
1		1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	9-1	10-1								
2			2-2	3-2	4-2	5-2	6-2	7-2	8-2	9-2	10-2	11-2							
3				3-3	4-3	5-3	6-3	7-3	8-3	9-3	10-3	11-3	12-3						
4					4-4	5-4	6-4	7-4	8-4	9-4	10-4	11-4	12-4	13-4					
5						5-5	6-5	7-5	8-5	9-5	10-5	11-5	12-5	13-5	14-5				
6							6-6	7-6	8-6	9-6	10-6	11-6	12-6	13-6	14-6	15-6			
7								7-7	8-7	9-7	10-7	11-7	12-7	13-7	14-7	15-7	16-7		
8									8-8	9-8	10-8	11-8	12-8	13-8	14-8	15-8	16-8	17-8	
9										9-9	10-9	11-9	12-9	13-9	14-9	15-9	16-9	17-9	18-9

Figure 2. Difficulty Ratings for the Number Combinations for Subtraction

Note.—The group of combinations outlined by the heavy lines are the more difficult combinations.

The problem here is vital to drill construction. If quantity of drill is the main factor and transfer between combinations can be depended upon, it is not necessary to build drill material carefully so that every number combination will appear a calculated number of times. But, if quality shares importance with quantity, drill should be so built that each number combination appears with a calculated frequency. The issue here may be expressed as "distributed versus non-distributed" drill.

EVIDENCE TO SUPPPORT THE CASE FOR DISTRIBUTED PRACTICE

The following evidence in the case is the result of an investigation conducted by Dr. Eva M. Luse. Dr. Luse studied the effects

of these two types of drill on six hundred fifth-grade pupils equally divided into two groups on the basis of general arithmetical ability.[1]

These two groups were given fifty consecutive drill periods of fifteen minutes each. One group used drill material carefully constructed as to the distribution of practice in addition, subtraction, multiplication, and division of whole numbers.[2] The other group used material slightly in excess as to sheer amount but so built that certain combinations were slighted. All other conditions were held constant. The appearance of the drill sheets was such that even experienced teachers and superintendents when asked to select the body of drill which they, upon half an hour's study, judged to be the better, chose the poorly distributed drill as often as the other. In constructing the drill, all possible practice was studied and controlled. For example, the addition practice concealed in checking addition examples, in carrying in multiplication, in adding the partial products, and in checking mutiplication, as well as all addition practice in carrying in multiplication used in long division and in checking long division was controlled.

Dr. Luse had a clean-cut issue. There were six hundred pupils whose experience with the four processes using whole numbers since the second grade had been approximately identical. They were now divided into two groups equal in ability, and for twelve and a half hours the experience of one group varied from that of the other only in the matter of frequency with which the number combinations were presented in all drill work. Should it appear that distributed drill was superior to non-distributed drill in twelve and a half hours of practice after the pupils had had common experiences for, say, one hundred hours, the reader can speculate for himself on the probable superiority of the distributed type of material when made available for all arithmetic work from Grade II through Grade VIII.

A complete inventory of all addition used by each group appears in Tables I and II. Table I shows the practice given to the group which used well-distributed drill; Table II, the practice in the

[1] Space forbids a complete description of the administration of Dr. Luse's investigation. For a complete report of the fundamental research see, Eva M. Luse, *Transfer within Narrow Mental Functions.* A Study of The Effects of Distributed versus Non-distributed Drill in Arithmetic. Iowa City, University of Iowa. (University of Iowa Monographs in Education, No. 5)

[2] This material is now available for school use. Knight, F. B., Studebaker, J. W., and Ruch, G. M. *The Arithmetic Work-Books.* Chicago, Scott, Foresman, and Company, 1927.

material which was rather poorly distributed. These tables are read as follows. In Table I, zero was added to zero 33 times; zero was added to one 102 times; zero was added to two 70 times; etc. The experiences with subtraction, multiplication, and division were similar to the addition experience as just shown.

After the fifty consecutive drill periods of fifteen minutes each, the two groups were given a series of tests. One series of tests was

TABLE I

NUMBER OF REPETITIONS GIVEN TO EACH OF THE ONE HUNDRED COMBINATIONS—DISTRIBUTIVE

SECOND ADDEND	FIRST ADDEND										TOTAL
	0	1	2	3	4	5	6	7	8	9	
0	33	102	70	84	89	79	43	46	43	36	625
1	47	78	101	92	91	86	80	72	80	76	803
2	26	86	85	85	78	72	77	90	68	47	714
3	35	62	67	34	58	60	50	49	54	46	515
4	31	83	55	89	68	73	60	34	52	35	580
5	34	57	73	60	70	51	53	42	41	27	508
6	36	74	73	57	79	45	60	55	48	41	568
7	23	62	39	34	50	56	46	43	44	35	432
8	41	81	56	63	58	69	54	51	48	53	574
9	35	39	58	36	41	52	36	40	56	42	435
Total	341	724	677	634	682	643	559	522	534	438	5,754

Practice on harder quadrant—21 percent
Practice on easier quadrant—79 percent

NOTE.—Numbers inclosed in heavy lines show the repetitions given the corresponding combinations similarly marked off in Figure 1.

given a few days after the drill periods and another three months later. Each series was so built that one part of each test contained combinations, upon which both groups had received much practice, another part contained many combinations which one group had practiced liberally but the other not so much, and a third part contained combinations which one of the groups had received relatively little practice upon. This made it possible not only to look

for gross mean differences but to study the difference as the examples based on disparity of practice relatively increased.

Further, each group was divided into fifths on the basis of ability as determined by performance on tests given at the beginning of the investigation. This made it possible to inquire into the

TABLE II

NUMBER OF REPETITIONS GIVEN TO EACH OF THE ONE HUNDRED COMBINATIONS—NON-DISTRIBUTIVE

SECOND ADDEND	FIRST ADDEND										TOTAL
	0	1	2	3	4	5	6	7	8	9	
0.....	131	242	211	97	87	67	74	47	65	51	1,069
1.....	112	245	217	187	154	92	108	75	60	49	1,299
2.....	76	220	179	122	67	59	42	31	18	14	828
3.....	58	155	115	96	72	25	30	15	16	21	603
4.....	62	143	158	104	72	49	34	22	19	10	673
5.....	67	191	168	117	75	68	34	21	3	17	761
6.....	69	208	112	90	57	30	32	17	13	12	640
7.....	67	124	117	66	42	21	20	18	12	9	496
8.....	60	173	137	50	51	17	20	23	16	4	551
9.....	60	106	63	51	31	14	17	9	8	11	370
Total.	762	1,807	1,477	980	708	439	411	278	230	198	7,290

Practice on harder quadrant— 6 percent
Practice on easier quadrant—94 percent

NOTE.—Numbers inclosed in heavy lines show the repetitions given the corresponding combinations similarly marked off in Figure 1.

relative effects of distributed versus non-distributed drill on different levels of general arithmetical competence.

The more pertinent of Dr. Luse's findings are:

1. Both groups made a decided gain from the fifty periods of drill. The gain for the distributed drill was from 20 percent to 54 percent in the number of combinations attempted, and 31 percent to 85 percent in the number of combinations correctly answered. The gain from the haphazard type of drill was from 11 percent to 40 percent in attempted combinations and from 13 percent to 61 percent in combinations correct.

2. The distributed drill gave an excess over the non-distributed drill in examples solved correctly. The gains attributable to distributed practice are:

	Percent
Addition	18
Subtraction	19
Multiplication	35
Division	24

3. The same relative differences in gain from the distributed and non-distributed drill held for the different levels of ability as for the whole group.

4. The permanent gain, namely, the gain held during the summer vacation, a period of no practice, in actual number of examples was greater for the group having distributed drill.

5. In the comparisons made there were 126 opportunities for either form of drill to yield results higher, equal, or lower than the other form of drill. The distributed drill excelled in 120 and the non-distributed in 6 of these opportunities. Of the 120 in which the distributed drill excelled 75 showed statistically significant differences, that is, the differences of the means varied from 3 to 12.9 times the probable error of the difference. Of the 6 cases in which the non-distributed drill excelled, no one of the differences was statistically significant.

Most readers will agree with the writer in his opinion that Dr. Luse's research closes the issue of distributed versus non-distributed drill, at least until a much better study reverses her data. Such evidence is a bit unlikely to be forthcoming. Until such further evidence is presented, it is valid to conclude that holding the amount of time given to arithmetic constant, holding the amount of drill constant, holding other factors which affect progress in arithmetic constant, the careful distribution of practice on the number combinations yields significantly better results than more easily constructed material. In other words, improvement in arithmetic may confidently be expected from the use of improved materials.

A STUDY OF WAYS AND MEANS OF REORGANIZING AND IMPROVING INSTRUCTION IN READING

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DURING the last six years the Research Committee of the Commonwealth Fund has subsidized important studies of curricular problems and investigations of the learning processes in different school subjects. The results of these studies have been significant and far-reaching. The members of the Research Committee have been increasingly convinced that the scientific study of fundamental problems is going forward more rapidly than the actual utilization of the products of research in the improvement of school practice. The recognition of this fact suggested the need of a detailed study of methods which may be employed by school officers in reorganizing and improving instruction in harmony with the findings of research.

Accordingly, arrangements were made two years ago for an intensive study of this problem. Reading was selected as the subject for investigation because many of the changes which should be made in the content and methods of teaching have been quite clearly defined during recent years through scientific studies, committee deliberations, and critical discussions. The preliminary steps were taken during the school year 1925-26, although the major part of the constructive work has been in progress during the current school year and will continue until June. The purpose of this discussion is to describe some of the steps which have been taken and to suggest tentative conclusions.

The chief aims of the investigation, as defined by the committee, were to study the problems involved in reorganizing and improving instruction in reading and to determine methods and procedures which may be employed in effecting the desired changes. These changes include not only improvement in the achievement of pupils in different phases of reading, but more particularly an enrichment of many classroom activities through the use of appropriate reading materials and the cultivation of desirable reading attitudes.

In order to accomplish these objectives, it was necessary to adopt several supervisory but supplementary aims. The effort was made to procure for the principals, the supervisors, and the teachers a broad vision of the social objectives of reading, a clear understanding of the relation of reading to each school activity, and a knowledge of needed changes in current practices together with the evi-

dence that justified them. An attempt was made to awaken interest and enthusiasm for valid reforms in reading instruction and thus to secure cooperation, initiative, and creative effort on the part of every teacher. The development of an objective attitude toward the problems of reading, with skill in the use of necessary techniques, was sought in order to lay the foundation for continuous, intelligent study and progressive reorganization and improvement of reading instruction. The results of the investigation thus far show conclusively that it is impossible to accomplish any vital reorganization of instruction without a sympathetic, vigorous program of teacher training.

That we might study these various problems under widely different conditions, the cooperation of two groups of schools was secured. The members of the first group differ primarily in the size of the administrative units represented and in the types of supervision provided. The schools of Rock Island, Illinois, a city of approximately forty thousand, belong to the first group. The supervisory staff includes a superintendent, two grade principals, and eleven elementary-school principals most of whom do little or no teaching. The five schools of Wilmette, Illinois, which are supervised by the superintendent and one principal, together with a six-room village school in Thornton, Illinois, supervised by a principal who teaches full time and by a rural supervisor, and Cook School, Rock Island County, which is under the supervision of a county superintendent, complete the group. The second group includes five schools representing widely different racial, social, and economic conditions. This group comprises a school in the heart of the colored belt in Chicago; another under the shadows of the steel mills of South Chicago, which is attended by foreign-speaking children of many nationalities; a school in Chicago Heights attended by American-born children of the second and third generations; and two schools in Evanston, Illinois, attended to a large extent by children from homes of culture, refinement, and wealth. Four schools also are serving as control centers, and more than two hundred teachers are actively cooperating in the study. No further reference will be made in this report to the experimental nature of the investigation.

During the school year, 1925-26, the purpose was to procure an accurate record of present practices and conditions and to gather the objective evidence of needed changes. To this end several types of information were collected. General statements were procured

from the supervisory officers describing the school organization involved, the character of the school population, the nature of the supervision provided, the course of study in reading, and any unusual conditions which might affect progress. Specific statements from the teachers were sought concerning their aims in the teaching of reading, the amount of time allotted to it, the types of reading activities engaged in during the reading period, and the difficulties encountered in teaching pupils to read. Records of the available material equipment were compiled, which included such items as the number of basal readers, supplementary books, library books, and practice materials at hand. The achievement of pupils was measured by determining the number of pages read throughout the year during the reading and literature periods, the number of books read independently during March and April, 1926, by pupils in Grades III to VI, and the amount of newspaper and magazine reading by pupils in Grades IV to VI inclusive. Achievement records in both oral and silent reading were procured in May, 1926, through the use of standardized tests.

As these records and other items of information accumulated, they were summarized and presented to the supervisors and teachers for study and interpretation. For example, the aims stated by the teachers of one school or school system were checked against those of another. These were in turn compared with the objectives listed by other groups of teachers and those presented in committee reports or formulated by experts in reading. Similar studies were made of the time devoted to reading, of the amount and kind of material read, and of the achievements of the pupils in both oral and silent reading. The chief purpose of this step was to help teachers procure a concrete, vivid picture of their practices and to determine through their own efforts the nature of the changes that were needed. As specific problems were recognized, they were studied in more or less detail during April and May. The Report of the National Committee on Reading was used widely as a source of help in these conferences.

This preliminary work increased the teachers' interest in reading problems and stimulated the desire to prepare more adequately for the work of the coming year. In several cases, teachers and supervisors arranged to attend summer courses in order to study reading problems in greater detail. Indeed, the principals and supervisors who did so are accomplishing the most effective results this year. Superintendents who contemplate a program of reorganization in any subject should encourage the members of their

supervisory staffs to study the field thoroughly in advance so that they may serve as efficient and stimulating leaders when the work is actually undertaken.

While the teachers were studying the obvious problems which confronted them, the supervisors under the direction of the writer were making more detailed analyses of facts and conditions to determine the fundamental weaknesses in the reading activities of each school. Some of the broader problems of reorganization were also considered. The analyses showed that the problems of these schools varied widely and required radically different treatment. For example, one school system ranked low in practically all phases of reading instruction and had done little toward enriching other subjects through appropriate reading activities, while a second system had attained a relatively high level of achievement in reading and had greatly enriched its course of study. Two elementary schools had secured a wide variety of reading materials for use in all subjects. In one of them oral reading predominated and in the other the pupils had not been taught to read intelligently. Consequently, inadequate use was made of the materials available, and the pupils ranked relatively low in achievement.

Sometimes the chief difficulty lay with the teachers. In several schools, they had had insufficient professional training and had little or no conception of the real purpose or place of reading in elementary education. In other schools, they were discouraged and had assumed a fatalistic attitude. Not infrequently, the difficulty could be traced to the failure of supervisors and principals to assume vigorous leadership among their teachers, or, through their tendency to become absorbed in routine, they adhered unwisely to regulations which sought to procure uniformity in practice. Frequent conferences with supervisors and principals showed clearly that many of them are quite unable to analyze the needs of their schools objectively and impartially. If reorganization of instruction is to proceed rapidly, principals and supervisors must become thoroughly acquainted with modern tendencies in different subjects and must become skillful in diagnosing the strong and weak points in the work of their schools and in determining needed changes.

By the opening of the current school year, keen interest had been aroused on the part of most of the teachers. It was decided therefore to start them at once on a very definite problem. Since practically all schools followed somewhat rigidly the grade plan of classification, an effort was made to help the teachers adapt the

instruction to the level of their pupils' achievement and to the needs of small groups and of individuals. To this end, various plans and procedures were discussed. The teachers were also supplied with forms of the Oral-Reading Check Tests and with unstandardized silent-reading tests each of which could be repeated at intervals during the year.

As the pupils of a room, except in the rural school, were tested, they were divided temporarily into three groups without regard to the grade-group to which they belonged. Some of the teachers were fearful, at first, lest this step would violate a sacred tradition of the classroom. No fearful consequences have resulted thus far, however. When tentative groups had been organized, the teachers determined the level of difficulty at which pupils of each group could read with at least fair success. Not infrequently, materials were selected which were prepared for pupils one or more years below the grade classification of the pupils to whom they were assigned. In the rural school, four fourth-grade pupils had to begin their reading work for the year in primers and first readers. A complete account of the problems which were encountered in adapting instruction to the needs and level of achievement of the pupils will be impossible in this report. Provision was made for pupils to engage at times in reading activities in grade-groups in order to preserve a feeling of class unity, but more frequently opportunity was provided for small groups having similar needs while almost daily provision for individual instruction was arranged.

Two important facts were revealed by this phase of the investigation. The first of these is that a wider range of reading material is necessary in each classroom than is ordinarily provided; and second, that many children who are failing in reading begin to take interest and to make rapid progress in the mastery of the subject when they are permitted to read materials which they can interpret with reasonable ease.

As the teachers worked constructively on the problem of adapting instruction to the needs of their pupils, it became evident that a clear knowledge of the essential features of a modern reading program was necessary if they were to participate intelligently in other efforts to improve instruction. In order to supply them with the information needed, a series of conferences was held in which were considered such problems as a modern program of reading in elementary schools, teaching pupils to think as they read, reading for different purposes, improving the nature and quality of reading in the content subjects, stimulating permanent interests in reading and

elevating reading tastes, improving the quality of oral reading, and establishing fundamental reading attitudes and habits. The important points of each discussion were mimeographed and distributed to the teachers at the time of the conference. Other topics might have been considered. Those which were discussed enabled the writer to present a somewhat vivid, comprehensive picture of modern tendencies in reading. One important lesson which this step in the study taught is that any information which is presented to teachers must be quite simple and concrete if it is to be fully comprehended. Much of the professional literature available today is sufficiently difficult to challenge the best thought of mature normal-school students. Unfortunately, most elementary teachers do not rank so high in habits of independent study.

The series of conferences continued throughout September and October, and specific suggestions were made relative to the changes needed in each school. By the end of October, the teachers began to realize that their own practices were far from ideal in many respects, and they asked for help. The supervisors and principals who responded at once to this call laid the foundation for rapid progress. In some schools, little or no help was given. As a result, progress has been far less rapid and effective. Indeed, in some schools I feel that little of permanent value has been accomplished thus far.

Supervisors and principals adopted different plans in securing progress. In some instances, regular meetings were held with the teachers of a building to consider how needed changes could be effected. The exchange of books was arranged so that a greater variety would be available in each classroom; specific types of teaching were discussed; problems which had been assigned for study were reported; and personal experiences were contrasted. Demonstrations of particular methods by a principal, supervisor, or teacher, proved valuable when followed by constructive suggestions. General discussions of schemes of planning one's work were helpful, especially when followed by conferences with individual teachers concerning plans which they had submitted. Daily classroom visits were found to be excellent supervisory devices when followed by carefully prepared discussions in which specific helps and references were suggested. Arrangements were also made for teachers to visit other classrooms or schools where they could see types of work illustrated in which they needed help. In fact, practically every known supervisory device was employed by one supervisor or another.

During November, a study was made of the teachers. The variety of problems encountered by supervisors in accomplishing any vital reorganization of instruction is affected by the types of teachers who are asked to cooperate. On the one hand, there are the open-minded progressive teachers, who are eager to make progress and who have initiative, independence, and good judgment; as well as the open-minded teachers who lack confidence, initiative, judgment, or experience. On the other, there are the teachers who have definitely established habits of teaching, who are interested primarily in defending their procedures against any change or modification; and also the teachers who adopt a fatalistic attitude, believing that the situation is hopeless and that there is no use trying. Then, too, there are the indifferent teachers and the time-clock teachers who are unwilling to give any thought to school problems outside of school hours who, therefore, follow the line of least resistance. Other sorts of supervisory problems are presented by the teachers who recognize the need of changes but who are unable to attempt them without guidance and suggestions at every step, by the teachers who are capable but who will not cooperate unless administrative pressure is exerted, and, finally, by the teachers who are unable to profit by suggestions.

If reorganization is to be accomplished, the needs of these and other types of teachers must be considered. The willing and capable must be given wide opportunity for initiative and creative effort; detailed help must be provided for those who need it; a more wholesome professional attitude must be cultivated on the part of some; and administrative pressure must be exerted on others. In some cases, I seriously question the wisdom of expending the tremendous amount of time, energy, persuasion, and pressure necessary to secure results. Supervisory officers differ as widely as teachers in their professional attitudes, insight, and skills. As I indicated earlier, efforts to reorganize and improve reading instruction in some of the schools is failing to a greater or less extent because principals are unwilling for one reason or another to assume adequate supervisory responsibility.

As the schools which are cooperating have made marked progress, they have been encouraged to undertake some of the larger problems which are involved in a complete reorganization of their reading programs. Rock Island, for example, has organized its teachers into ten committees to work on such problems as, a program of pre-reading activities; seat work that provides learning opportunities; methods and reading materials appropriate in content

subjects; methods of stimulating interest in independent reading; methods of promoting enjoyment and appreciation of good selections; methods of developing accuracy, independence, and fluency of recognition; and methods appropriate for different types of remedial cases. Teachers have been assigned to committees on the basis of interest and demonstrated efficiency. As the committee work goes forward the teachers are studying all the professional literature available that relates to their problem.

The principals, supervisors, and superintendents are serving as a committee to summarize the work of the year and to coordinate the results of the committee's activity. Their final report will take the form of an outline or course of study which may serve as a basis for further constructive work next year. Superintendent Bardwell, assisted by his staff, is making a survey of the reading materials needed for an enriched reading program throughout the elementary grades and is preparing to secure what is needed through the adoption of a carefully planned budget distributed over a period of from three to five years.

The teachers of Wilmette are devoting considerable thought and energy to the problem of providing adequate reading material in content subjects. A school librarian has been secured who works in cooperation with the staff of the public library. A committee of teachers is selecting important topics or problems in each subject for which supplementary reading is necessary. The librarian and the committee are making lists of available materials and determining additional references which are needed. It is planned that next year teachers will notify the librarian at least a month in advance concerning the units which are to be studied. The librarian in turn will see to it that the books and other needed materials are delivered in sufficient time. In Lincoln School, Evanston, a special study is being made of remedial work, and a remedial period has been added to the daily program. Other schools are doing equally productive work. A comparison of the activities carried on in the various cooperating schools shows clearly that vital reorganization occurs only as supervisors and teachers work together intelligently and vigorously to bring about needed changes and to improve the quality of their work.

SUMMARY

Time will not permit on this occasion a more detailed report of the various activities in which the cooperating schools have en-

gaged. It may be appropriate to refer in closing to a few conclusions which seem justified at this time.

1. When I consider the progress that has been made in some of the cooperating centers I am greatly encouraged over the possibilities of keeping classroom practices in close accord with progressive tendencies and with the findings of scientific research. For example, during the first four months of the current school year the teachers and supervisors of Rock Island, Illinois, have attacked the problem of reorganization so whole-heartedly and vigorously that they have radically modified and improved both the content and quality of their instruction in reading. The interest stimulated in the study of reading problems has passed over to other subjects and has generated in them a spirit of inquiry and a desire for improvement. The additional study of reading problems and the constructive committee work which is now under way should result by the end of the year in marked progress toward a valid and fundamental reorganization of reading activities. Equally encouraging statements may be made concerning the progress in other schools. On the other hand, very little has been accomplished in a few schools. These problem cases are valuable as far as the investigation is concerned, because they show quite clearly what some difficulties are that must be overcome in reorganizing and improving instruction in many school systems.

2. Since reading is intimately related to practically all school activities, efforts to reorganize and improve instruction in reading must be accompanied by similar steps in other subjects. It is an interesting fact that many teachers and supervisors think at first that the chief aim of improving reading is to increase the achievement of pupils in tests of speed and comprehension. Valuable as good habits of silent reading are, the major aims to be achieved are enriched experiences and wholesome interests acquired through wide reading in each school subject or activity. In order to accomplish these aims provision must be made for suitable reading material in each grade. The content of each subject must be studied to determine important units or problems, the study of which requires reading materials. Furthermore, techniques must be developed for teaching pupils to read and to study for a wide variety of useful purposes. As a matter of fact, it has been necessary in this investigation to consider a large number of curricular problems in the efforts to make reading serve its proper function in the elementary schools which are cooperating.

3. The reorganization of instruction in reading means progress from a lower to a higher level of teaching. With the enrichment of the curriculum, the wider demand for varied reading activities, and a recognition of the need of individuals, the problems of instruction have become more complicated, and require in turn a relatively high order of intelligence, a broader grasp of content, a keener sense of values, and a more technical knowledge of learning processes than was necessary in the past. It has been interesting to observe during the course of the investigation the ease with which many teachers have adjusted themselves to a new order of things and the great difficulty which others have encountered in breaking away from routine and tradition. It is obvious that rapid progress in any fundamental reorganization of instruction requires the wholehearted cooperation of supervisors and teachers who are able to make personal adjustments and to place their own activities on a new and higher plane.

4. One of the most common errors in classroom activities today is the practice of permitting children to fritter away intellectual energy while reading. There is need in every grade of discovering worth-while purposes for reading, of developing keen interest in reading activities whether for study or recreation, of stimulating the pupil to think actively while reading, of providing opportunities for the use of the information secured, of setting up high ideals of achievement, and of holding pupils definitely responsible for satisfactory results. These problems are so vital that they should challenge the interest and vigorous effort of supervisors and teachers throughout the country.

5. Finally, the reorganization of instruction in reading is not only a function of service, but an activity of research as well. At every step in the investigation, it has been necessary to study important problems for which no solution had yet been suggested. The problems in one school differ materially from those of another. Valid changes can be effected only as reorganization is undertaken in a spirit of inquiry and investigation.

A TECHNIQUE FOR THE CONSTRUCTION OF A TEACHER-TRAINING CURRICULUM

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To secure data for an analysis of the duties of teachers in the public schools, one may go to several sources: teachers' diaries, observers' reports, professional literature, and teachers' memory lists. If teachers' diaries could be extensive enough to include everything that teachers do, it is obvious that they would furnish the most comprehensive list of duties that could be obtained from any source. Practically, however, they do not yield this material in full, because no teacher is able to write down in a series everything that he does in and outside the classroom. As a matter of fact, if he tried to do this, he would be writing constantly and would have no time left for doing things about which to write.

At best, the diary gives only the outstanding activities that the teacher performs from hour to hour. In a study of homemakers' duties we found, for instance, that over a period of seven days the diaries kept by homemakers provided an average list of 250 duties, some of which were duplicates. It is apparent that this would not be a complete list of the tasks performed by the homemaker.

Completeness of report through the diary is safeguarded chiefly by securing such a large number of diaries that the duties missed by one diarist will be caught by another. Even by the use of this precaution we cannot be certain that a complete list of duties will be secured, but we do know that it grows increasingly complete in proportion to the number of diaries used.

In some ways there is considerable advantage in having an observer make a list of duties performed by a second person rather than to have the latter keep his own diary. The observer can give a more accurate report, provided the person being studied will give explanations of what he is thinking about in those moments when the observer cannot infer his mental processes from his physical activities. The use of observers is more effective than the use of diarists because of the fact that two people are working on the job of reporting instead of one. In this way the teacher can go on with his regular duties, and the observer as a second person can write them down. In our use of the observer with executive secretaries of the Young Men's Christian Association in Chicago, we have

found that this technique produces unusually good results, particularly in those cases where the executive secretary gave leads to the observer concerning his mental activities. We found that if the observer spent about four days with each executive and covered all the executives in turn, he had in the neighborhood of seven thousand distinct duties from observations of thirty executives.

The chief objection to the use of observers for reporting the activities of teachers is a practical rather than a theoretical one. It would be extremely expensive to secure a sufficient sampling of teachers to be observed if the work were to be paid for by one central agency. The hope for the use of this method lies in the voluntary service that graduate students and other research assistants will give in the preparation of theses, reports, and the like. By this natural means a large mass of material, eventually secured through observation, will be collected for the use of the curriculum analyst.

Professional literature provides reports in very definite form. These, however, are not more accurate than are the original observations of the persons who contribute to the literature. We have found this source to be useful chiefly in checking the material found in other sources.

In our present study of teachers' activities, the source upon which we have placed initial reliance has been the memory lists of teachers. From some six thousand teachers enrolled in summer schools in 1925, we secured in the neighborhood of three hundred thousand duties many of which, of course, were duplicates. On the average, each teacher provided us with a list of fifty duties. The incompleteness of fifty duties as a picture of the duties of any one teacher was safeguarded by the large number of incomplete lists that we had. It was felt that by adding one to the other we might secure a composite picture which would approach reality.

When twelve thousand duties had been carded, they were classified. To them were added all the observers' reports that could be discovered. Lists derived from these two sources were submitted to twelve hundred teachers in service for any additions they could make. Then the literature in each of the fields was read. After this had been done, additional summer-session blanks were read until no new type of activities occurred. The product resulting from these steps has now taken the form of a list of about six hundred type activities which constitutes as complete a list of duties as we are able to provide by the techniques available at the present time. The list that we have prepared we believe to be a master list of the duties which are performed by teachers.

If we wish to discover what duties are performed by any one class of teachers, the technique is simple. We ask a sufficient number of teachers belonging to that class to check the duties they perform, and the resulting frequency table will differentiate the duties for each class, as well as show the duties that seem to be common to all teachers. At present, we are having this done for rural-school teachers and for high-school teachers.

At the same time that we have been securing the list of activities, we have also been working upon the traits of personality and character of teachers. We have now completed the traits for high-school teachers by the use of the personnel-analysis method, and are proceeding to a similar analysis for junior high-school teachers, elementary-school teachers, and rural-school teachers.

After we had secured the frequency list of activities for high-school teachers, we submitted it to three other tests. We determined the relative difficulty of the activities, their general importance, and the relative necessity for teaching them in school rather than leaving them to be learned on the job. When combined into a single picture, these four criteria—frequency, difficulty, importance, and job-learning—will provide us with a basis for selecting the duties to be covered in a curriculum when all the duties cannot be considered. This task is now being done for the high-school teachers of Nebraska, and for the graduates of the School of Education of the University of Chicago.

We are now undertaking the succeeding steps that are involved in the preparation of a curriculum for teachers. The first of these steps is to determine the objectives that teachers have in mind in the performance of these activities. This is being done by the use of the inductive method. That is to say, instead of setting up the teacher objectives *in vacuo*, and proceeding by analysis to apply them to each individual duty, we are scrutinizing each duty that teachers perform and asking why it is performed. The replies to the question, "Why?" as applied to each specific duty in turn, will give us a mass of concrete reasons which, when classified into larger and larger groups, will lead us back finally to a few objectives. These will constitute the objectives of the educators who construct the particular curriculum for teachers in a specific locality.

It is perfectly obvious, of course, that when we seek to express the objectives for a school we are dealing with quite subjective material. Indeed, the major objectives will not yield to scientific treatment. If the faculty of one training school decides that its chief objective is to develop the attitude of research in its graduates,

and another faculty decides that its aim will be to develop the attitude of service, we have no means of deciding with absolutely scientific precision which is better. Each faculty must set up its own objectives; but, once these objectives have been set up, the process of analysis grows increasingly scientific as it becomes more and more detailed.

The objectives, the activities, and the traits having been determined, it is necessary to investigate the difficulties that teachers encounter in carrying on the activities under the domination of the objectives and traits. These difficulties are being collected in certain specified teaching units.

When we have determined such difficulties in addition to the objectives, traits, and activities, we are in possession of the topics that are to be treated in the course of study for teachers. The body of the curriculum consists of statements of the methods by which these difficulties are overcome. These methods are collected partly from experts as revealed in the literature and partly from the teacher in the classroom. Undoubtedly, teachers have many excellent empirical methods for handling the problems and difficulties of the schoolroom that have never been collected. It is equally clear that in the laboratories and classrooms, experts in reading, arithmetic, and other subjects of the curriculum have worked out techniques of teaching which frequently are superior to those normally used by the teachers who are untrained in scientific techniques. From both these sources it is possible to secure the very best methods of teaching that are available at the present time.

When the foregoing techniques have been carried through, we have at hand the methods used in teaching special subjects, in school management, in teacher relation with the community, and in extra-curricular activities. They tell, in short, how the problems are solved.

In order that the teacher's hold upon methods shall be as intelligent as possible, it is necessary to acquaint him with the principles which underlie classroom methods. That is to say, by asking why one method works successfully and why another method fails, we are driven back to facts and principles of psychology, sociology, economics, and other fundamental subjects. When this material is sorted into different fields, we are able to derive the content of educational psychology, of educational sociology, and such fundamental subjects. Similarly, if there are any important techniques whose evolution is described in the literature of the history of education, they become topics for discussion in that field.

Practically, to supplement the derivation of the fundamental subjects from the activity lists, we should examine the materials in psychology, sociology, and so forth, as a check against the principles which have been derived by the method just described. When principles are found which are not included in this list, the query should be raised as to whether or not they can be found in applied form in the classroom. If they can, they should be added to the functional list.

By these means the content of the fundamental service subjects can be determined with very considerable definiteness. With the use of these controls we can decide that Item A in psychology shall be included in educational psychology, while Item B shall be excluded. Obviously, if one can find no application of Item B to the field of education, it should not be included. If, however, there are possibilities of its use which have not yet been explored, it would appear that it is a problem of research to discover what the applications might be; but until such applications have been demonstrated, there seems to be no good reason why the principle contained in the basic subject should be included in the teaching material of the applied subject. Specifically, until the research workers have shown that a principle in psychology is applicable to school procedure, it does not belong to the fundamental course in educational psychology. It should not be included in basic textbooks in that subject except as a research problem for those institutions that consider the development of the research attitude in their students to be one of the objectives of their course of training.

In conclusion, it may be said that by the use of these techniques, a teacher-training faculty can decide upon the kind of teachers it is going to prepare, the traits to distinguish its graduates, the objectives that they should have in mind, the duties they are to perform, the difficulties they will encounter, the methods of overcoming these difficulties, and the basic principles underlying the methods used. This will provide the raw material for a curriculum in teacher training. All that remains to be done is to arrange the material in pedagogical form in terms of the amount of time that can be devoted to the training of teachers, and in terms of the facilities of the school. The basic raw material should be provided for the use of the faculties. The preparation and use of this material in teaching, and its development into pedagogical form, rest in the last analysis upon the faculty of each teacher-training institution.

A REPORT OF A CONTROLLED STUDY OF THE LEARNING OF MULTIPLICATION BY THIRD-GRADE CHILDREN

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TEACHERS of third- and fourth-grade arithmetic are constantly confronted with many perplexing problems in teaching the fundamental combinations. Some of the unanswered questions that arise are: To what extent shall each child be required to develop each combination? Shall the developmental work be placed on the blackboard and supplemented with oral explanation and instruction? Shall the material of the text, either basal or supplementary, be depended upon for the developmental work? In what order shall the combinations be taught? and, What is the relative difficulty of the combinations?

So far as I know only one textbook has yet appeared in arithmetic containing adequate developmental work in the fundamental combinations.[1] This text only recently has been made available for general use, but already has been received with open arms. One interesting feature of this new arithmetic is the fact that the fourth-grade book contains more than four hundred pages, in sharp contrast to the traditional fourth-grade book which usually includes from one hundred and forty to one hundred and sixty pages. If the class-room teacher is to approach the status of an educational pilot, possessing the precise and unerring ability of the scientist coupled with the understanding sympathy of the parent, she must be free from the unreasonable amount of labor now necessary for the preparation and use of supplementary material. It is evident that basal texts in all subjects, and particularly in arithmetic, must be written and organized in terms of learning steps, and that detailed simplicity must characterize all developmental subject-matter.

Obviously, the order in which combinations should be learned and the relative difficulty of such combinations are closely related. Smith, Holloway, and Clapp[2] have made the most dependable

[1] Knight, F. B., Studebaker, J. W., and Ruch, G. M. *Standard Service Arithmetics.* Chicago, Scott, Foresman and Company. 1926. Book II. 442 pp.

[2] Smith, H. H. "Arithmetical Combinations," *Elementary School Journal,* 21: 762-70, June, 1921.

Holloway, H. V. "An Experimental Study to Determine the Relative Difficulty of the Elementary Number Combinations in Addition and Multiplication." 1914. 102 pp. Doctor's thesis, University of Pennsylvania.

Clapp, F. L. *The Number Combinations: Their Relative Difficulty and the Frequency of Their Appearance in Textbooks.* Madison, Wisconsin, University of Wisconsin, 1924. (Bureau of Educational Research Bulletin, No. 2)

studies concerning the relative difficulty of arithmetical combinations; of these the most extensive is the one by Clapp. As is true of practically all available studies of pupil achievement, these investigations present the results of unknown and uncontrolled learning conditions. Indeed, classroom teachers are much more efficient in discovering and identifying abilities and deficiencies than they are in the development and correction of such characteristics. In other words, any one can give an inventory test in the one hundred multiplication combinations and point out the combinations that were missed, but what teacher would be daring enough to say exactly how many times and in what way the combinations that were missed should have been presented, or should be presented for the avoidance or correction of such errors!

The following discussion is a report of a controlled study of the learning of multiplication by third-grade children.[3] An attempt was made (1) to teach the one hundred combinations by means of text material alone, the teacher doing as little talking as possible; (2) to make remedial adjustments by means of printed directions and devices rather than oral instructions; and (3) to ascertain the relative difficulty of the one hundred combinations when they were developed by the pupils individually, and when the frequency of drill on each combination was the same.

The study is based on the work of thirty-one children in the first half-year of the third grade in the Randall School, Madison, Wisconsin, over a period of twenty days, between March 22 and April 16, 1926. On the combined scores of Scales A and B, Form I, of the National Intelligence Tests, the intelligence quotients ranged from 94 to 137, the median being 104.5. An inventory test of the one hundred basic multiplication combinations showed a range of from 0 to 66 with a median of 23 in the number right, indicating that some of the children had already learned quite a significant number of the combinations, while others apparently had acquired little or no skill in multiplication.

As previously indicated, it was proposed that the pupils learn the combinations and practice them by means of printed directions alone. The text and drill material used were sections of the

[3] I wish to express my genuine appreciation to Mr. Gosling, superintendent of schools at Madison, Wisconsin, and to Miss Hannah Fjelde of the Randall School, for making this study possible and assisting in the keeping of records. To Melvin Charles Pierce, graduate student of the University of Wisconsin, goes a large amount of credit for assuming the rôles of teacher, clerk, and statistician in conducting the study.

DAILY CLASS RECORD FORM SHOWING RIGHT AND WRONG ANSWERS AND OMISSIONS IN ORDER OF TRIAL ON THE COMBINATION DEVELOPED AND PRACTICED THAT DAY

Combination 0 x 0 Date.....

Pupil	Order of Appearance																																			
	1			2			3			4			5			6			7			8			9			10									
	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O
1																																				
2																																				
3																																				

Figure 1. Sample of Form 1

INDIVIDUAL RECORD FORM SHOWING RIGHT AND WRONG RESPONSES AND OMISSIONS IN ORDER OF TRIAL ON BASIC ONE HUNDRED MULTIPLICATION COMBINATIONS

Name of Pupil.....

Combination	Order of Trial																																			
	1			2			3			4			5			6			7			8			9			10									
	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O
0 x 0.....																																				
0 x 1.....																																				
0 x 2.....																																				

Figure 2. Sample of Form 2

CLASS RECORD FORM SHOWING RIGHT AND WRONG RESPONSES AND OMISSIONS TO THE COMBINATIONS DEVELOPED AND PRACTICED DURING ONE WEEK

Week of.....to.....

Pupil	Combination																																			
	0X0			0X1			0X2			0X3			0X4			0X5			0X6			0X7			0X8			0X9			0X10					
	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O	R	W	O
1																																				
2																																				
3																																				

Figure 3. Sample of Form 3

Fowlkes-Goff Arithmetic Book I, Part I.[4] Approximately thirty-five minutes were devoted each day to the work. When a pupil was absent, the lesson was made up within as many days' attendance as the child had been absent.

Each child was given mimeographed text material each day which developed a group of ten combinations by the additive method in chance order. This required about twenty minutes daily. The material was then collected and a sheet on which each of the combinations that had just been developed appeared ten times was distributed to each child. Working these took from ten to fifteen minutes. These were then collected and from five to ten minutes were spent in problem work. The children who finished first were allowed to read anything they chose other than arithmetic.

TABLE I

RECORD OF THE PUPILS OF GRADE III-B ON THE ONE HUNDRED BASIC MULTIPLICATION FACTS—NUMBERS OF RIGHT ANSWERS

	Lesson 11	Lesson 12	Lesson 13	Lesson 14	Lesson 15	Lesson 16	Lesson 17	Lesson 18	Lesson 19	Lesson 20
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Median correct	59.5	66	68	69	72	75	75	80	88	91
Q_3	70	77.5	76.5	81	83	86	90	93	96	98
Q_1	42	54	58	57	61	67	67	70	67	79
Range	53	51	57	46	57	53	45	42	45	39

On the eleventh day, the one hundred combinations were worked which occupied about twenty minutes, and the rest of the class period was spent in solving concrete problems which contained selected multiplication combinations. Beginning with the twelfth lesson, and continuing through the twentieth, each child was given a list of the combinations which he or she had missed the previous day. The pupils copied these combinations, worked them, and handed them to the teacher. This usually took about ten minutes. Then, as has been indicated, the rest of the class period was spent in working the one hundred combinations and solving problems.

Table I shows the progress of the class on Lessons 11 to 20. Attention is called to the fact that the median number of combinations right changed from 59.5 on the eleventh lesson to 91 on the twentieth lesson, and that the range in the number of combinations right changed from 53 to 39. These were the results when the com-

[4] Mimeographed edition, 1926.

binations were developed individually by the pupils, worked ten times on the day they were developed, and ten times later among the complete list of the one hundred combinations. How much better performance could have been accomplished remains unknown. However, it seems probable that the class had approached an operating limit at least for that length of time.

The correlation[5] between the ranks of difficulty of the one hundred basic combinations in multiplication as found by Professor Clapp and those disclosed in this study are:

	r
Grade IV	66
Grade V	44
Grade VI	36
Grade VII	32
Grade VIII	42
Grades IV-VIII	42

It should be remembered that the difficulty of the combinations, as shown in this study, represents their difficulty as they are first learned, while the relative difficulty of the combinations, found by Professor Clapp, reflects the skills as they have been maintained and fixed during the school life of the child. It should also be kept in mind that the one study reveals the difficulty of the combinations without reference to frequency of drill, while the other attempts to relate the relative difficulty to such drill.

Comparisons were made between the achievement of the Randall class and the achievement of the other third grades and the fourth grades of the entire school system of Madison on the one hundred multiplication facts. Lack of space will not allow a detailed report of these facts. It is interesting to know that the Randall beginning third grade, while spending approximately 70 percent less time on the combinations, were nearly 50 percent more efficient in solving the basic one hundred combinations of multiplication.

Classroom teachers will probably be most interested in the relative difficulty of the combinations as found in this study when compared with the relative difficulty of the combinations as found by Professor Clapp. The one hundred combinations with their ranks in difficulty in comparison with the study by Clapp are presented in Table II.

From Table II and the correlation coefficients just listed, it would seem that drill on the basic one hundred combinations in multiplication has not been related to the difficulty as revealed in the original learning. This is strikingly illustrated by a study of

[5] Derived from rho.

TABLE II

RELATIVE DIFFICULTY OF THE ONE HUNDRED MULTIPLICATION COMBINATIONS AS FOUND BY CLAPP AND FOWLKES—ARRANGED BY RANKS

COMBINATIONS	FOWLKES GRADE III	CLAPP*					
		Grade IV	Grade V	Grade VI	Grade VII	Grade VIII	Grade IV–VIII
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0 x 0	100	100	100	100	100	100	100
0 x 1	83	25	7	9	7	5	4
0 x 2	79	37	12	7	10	6	7
0 x 3	76	35	22	15	9	12	13
0 x 4	71	32	9	11	13	10	8
0 x 5	78	21	4	5	4	2	2
0 x 6	80	19	15	13	12	9	10
0 x 7	87	34	5	8	3	4	3
0 x 8	92	13	2	3	2	3	6
0 x 9	86	40	19	14	6	16	15
1 x 0	45	51	29	18	15	18	19
1 x 1	91	12	32	31	29	29	29
1 x 2	57	73	58	59	43	57	62
1 x 3	77	94	98	96	95	91	97
1 x 4	70	91	96	93	85	95	95
1 x 5	82	97	94	84	45	82	91
1 x 6	88	86	87	86	92	85	90
1 x 7	85	95	97	92	98	94	99
1 x 8	93	89	92	76	79	87	86
1 x 9	84	77	70	61	90	58	70
2 x 0	52	46	16	10	5	7	9
2 x 1	96	87	99	75	73	76	89
2 x 2	63	98	91	82	99	93	92
2 x 3	73	72	81	74	65	84	77
2 x 4	65	68	55	52	38	38	56
2 x 5	59	93	95	88	97	99	96
2 x 6	75	64	60	58	72	65	64
2 x 7	62	71	71	95	71	81	76
2 x 8	74	85	93	99	76	90	94
2 x 9	72	82	90	81	96	92	88
3 x 0	47	48	25	2	17	15	16
3 x 1	89	90	83	73	84	79	84
3 x 2	81	81	85	85	88	97	83
3 x 3	60	70	78	71	83	62	73
3 x 4	42	57	59	51	75	47	55
3 x 5	61	65	74	69	56	68	68
3 x 6	51	62	65	68	70	78	65
3 x 7	56	45	52	39	50	49	47
3 x 8	49	36	40	37	57	37	42
3 x 9	38	47	39	48	53	54	45

*Arranged after Clapp, op. cit., pp. 26-27.

TABLE II—*Continued*

RELATIVE DIFFICULTY OF THE ONE HUNDRED MULTIPLICATION COMBINATIONS AS FOUND BY CLAPP AND FOWLKES—ARRANGED BY RANKS

COMBINATIONS	FOWLKES GRADE III	CLAPP					
		Grade IV	Grade V	Grade VI	Grade VII	Grade VIII	Grade IV–VIII
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
4 x 0	40	44	11	6	8	11	5
4 x 1	95	88	72	64	59	75	78
4 x 2	68	67	49	57	67	53	57
4 x 3	54	63	84	79	64	67	71
4 x 4	25	66	77	91	78	86	79
4 x 5	46	55	56	66	40	66	54
4 x 6	30	31	41	43	63	48	43
4 x 7	26	10	24	28	32	40	28
4 x 8	31	23	43	45	52	45	41
4 x 9	14	7	27	25	26	24	27
5 x 0	39	49	23	17	16	17	18
5 x 1	94	99	88	94	94	98	98
5 x 2	64	78	75	83	62	77	80
5 x 3	53	61	64	56	66	61	58
5 x 4	37	75	89	98	93	96	87
5 x 5	34	76	80	72	60	41	72
5 x 6	23	33	36	42	31	56	39
5 x 7	22	50	46	47	34	39	48
5 x 8	44	43	48	41	44	33	44
5 x 9	20	52	51	46	49	31	49
6 x 0	50	38	18	1	11	13	14
6 x 1	99	80	86	97	82	89	85
6 x 2	69	69	73	55	58	64	67
6 x 3	24	53	63	70	87	72	60
6 x 4	18	58	69	60	81	60	61
6 x 5	36	60	57	78	69	74	63
6 x 6	6	59	66	54	61	71	59
6 x 7	9	28	38	50	42	36	40
6 x 8	4	11	28	27	28	30	25
6 x 9	1	5	21	19	25	22	22
7 x 0	48	18	3	4	1	1	1
7 x 1	98	92	76	77	48	70	81
7 x 2	67	79	68	67	86	69	75
7 x 3	35	42	50	53	51	55	51
7 x 4	17	14	30	32	41	34	32
7 x 5	28	56	53	44	68	51	53
7 x 6	21	15	34	30	35	32	33
7 x 7	11	30	45	49	54	80	46
7 x 8	2	3	6	26	23	23	24
7 x 9	7	6	20	22	21	20	23

TABLE II—*Continued*

RELATIVE DIFFICULTY OF THE ONE HUNDRED MULTIPLICATION COMBINATIONS AS FOUND BY CLAPP AND FOWLKES—ARRANGED BY RANKS

COMBINATIONS	FOWLKES GRADE III	CLAPP					
		Grade IV	Grade V	Grade VI	Grade VII	Grade VIII	Grade IV-VIII
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8 x 0	43	22	17	16	14	14	12
8 x 1	90	74	67	65	74	52	69
8 x 2	58	84	82	87	80	73	82
8 x 3	32	54	62	90	77	88	66
8 x 4	16	26	37	34	33	44	36
8 x 5	33	20	44	40	37	26	35
8 x 6	10	8	26	23	24	28	26
8 x 7	3	2	8	21	22	27	20
8 x 8	13	16	1	38	30	59	34
8 x 9	8	9	31	29	39	35	30
9 x 0	41	29	10	12	18	8	11
9 x 1	97	83	61	80	89	63	74
9 x 2	55	96	79	89	91	83	93
9 x 3	29	27	33	36	55	50	38
9 x 4	12	17	35	33	27	25	31
9 x 5	27	41	47	63	47	43	50
9 x 6	5	4	14	24	19	21	21
9 x 7	15	1	13	20	20	19	17
9 x 8	19	24	42	35	36	42	37
9 x 9	66	39	54	62	46	46	52

the relation of the relative difficulty of zero combinations. Within the last few years, much stress has been laid on the inherent difficulty of the 19 zero combinations, and yet an inspection of the rankings of these zero facts as shown in Table II raises grave doubt as to the validity of this emphasis. Attention is called to the fact that 0 x 0 which has been presented to and practiced by pupils rather generally in all grades is the easiest of the one hundred multiplication facts. Despite the fact that the correlation between the relative difficulty of the whole one hundred facts as found in Grade III of Randall School and Grade IV of the Clapp study is 0.66, the correlation of the relative difficulty of the 19 zero combinations alone for these three grades is only 0.36. Further evidence of the disparity between the relative difficulty of the combinations, as shown in the two studies, is available in the fact that only fifty-four of the one hundred combinations fall in the same quartile of difficulty when the ranks in the Randall study and Grade IV of the

A PLAN FOR RATING SCHOOLS ON THE BASIS OF EFFICIENCY

Clapp study are compared. Also, it should be remembered that all of the correlations presented indicate little other than a chance relationship.[6]

SUGGESTIONS AND OBSERVATIONS

The study presented here is tentative rather than final. The following statements, however, seem to be justified as suggestions and observations.

1. Text material organized in sufficient detail is more effective in developing new material than the usual oral presentation accompanied by inadequate text material.

2. There seems to be much less difference in the difficulty of the one hundred basic multiplication facts than has been concluded from studies of uncontrolled learning and practice conditions. This fact is revealed in the figures—not reproduced here—from which the rankings in Table II were derived.

3. Classroom teachers should give inventory tests to their pupils in order to direct drill intelligently rather than accept the occurrence of error in other localities as a basis for drill.

4. The zero combinations can be taught and mastered just about as easily as any others.

5. There should be many controlled studies, carefully organized and minutely planned, on learning the basic combinations in all operations.

6. Drill material should be based on the method of teaching, that is, on the manner and form of development, rather than on the frequency of error in the combinations.

7. Up-to-date textbooks in arithmetic have contained far too few pages to present an adequate treatment of the component elements of the different operations.

8. From an experimental standpoint, as well as from an educational standpoint, it would probably have been better to develop only five combinations a day and extend the study over forty days instead of twenty days.

9. One of the additional studies that are needed most is "the relation between achievement on the combinations as they appear in isolated form in abstract examples and in concrete problems"—all in relation to the original development and presentation.

[6] Ruch, G. M. *Objective Examination Methods in the Social Studies.* Chicago, Scott, Foresman, and Company, 1926. p. 114.

ARITHMETIC FUNDAMENTALS—

A PLAN FOR RATING SCHOOLS ON THE BASIS OF EFFICIENCY

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SCHOOLS are expected to develop certain abilities in the pupils who attend them, and any rating of a school should be based on the desirable changes which take place within the pupils. There are many abilities which we expect teachers to help pupils to acquire, and all these abilities have to be measured if we are to determine the efficiency of the school on this basis. When a doctor wishes to know the condition of his patient, he determines his temperature, his pulse, his respiration, and his blood pressure. All of these things have significant meaning in the diagnosis of the weaknesses of his patient and point the way to remedial measures. The physician measures the patient in these items on the basis of certain standards, for he knows such facts as the normal temperature, the normal blood pressure, and the like, for a person of the age of the patient whom he is attending.

Similarly, in measuring schools on the basis of efficiency, we must know the objectives of instruction. These several objectives must be expressed in definite measurable terms just as the standards employed by the physician are expressed. After these objectives have been determined, measuring devices must be selected or developed for determining the amount of each of the abilities which has been acquired by the pupils in the school.

The mental level of pupils in different schools presents a variable factor which enters into the determination of definite standards and the measurement of the efficiency of the schools when judged by the attainment of these standards. The efficiency of a school whose pupils are of a low level of intelligence because of poor home background and poor inheritance cannot be expected to equal the degree of efficiency reached by a school whose pupils are of a high level of intelligence due to excellent home background and good inheritance. It thus becomes necessary to adjust the ratings of schools to the varying mental levels of the pupils in these schools.

In Chicago we have made a fair beginning at rating the schools on the basis of efficiency. During this year, we have set up certain definite objectives which the pupils of the schools are expected to reach. The following is a modification of the tentative standards outlined in the *Annual Report of the Superintendent of Schools* for the year ending June 30, 1926.

ARITHMETIC FUNDAMENTALS—

Standard 100 percent

The pupils of each grade, at the completion of the grade, should be able to make 100 percent on exercises in the constantly used fundamental operations which have been learned in that grade and in lower grades.

ARITHMETIC REASONING—

Standard 80 percent

The pupils of each grade, at the end of the grade, should be able to solve problems of the following standards of difficulty:

Grade IV.—If an electric car runs 9 miles an hour, how many hours will it take to travel from one city to another, 117 miles apart?

Grade V.—Two tubs of maple sugar weighed 42 pounds. One weighed 18¼ pounds. How many pounds did the other weigh?

Grade VI.—A news dealer bought some magazines for $1.00. He sold them for $1.20, gaining 5 cents on each magazine. How many magazines were sold?

Grade VII.—A merchant buys ½ dozen handsaws at $16.00 a dozen. How much must he receive for the lot in order to gain 50 cents apiece?

Grade VIII.—On a map, a line 2¾ inches long represents a distance of 132 miles. How many miles are represented by a line 8½ inches long?

READING—

Standard 60 percent

At the completion of each grade, pupils should be able to reach the standard score on accepted standardized tests.

PENMANSHIP—

Standard 95 percent

All pupils completing Grades VI, VII, and VIII should habitually write with a quality on the Ayres scale equal to or better than the following: Grade VI, 50; Grade VII, 55; and Grade VIII, 60.

SPELLING—

Standard 95 percent

At the completion of each grade, the pupils should be able to spell correctly the words of their own grade and lower grades. The Chicago Spelling List consists of only twenty-three hundred words. This gives a maximum of eleven words per week in the third grade.

LANGUAGE—

Standard 80 percent

Pupils of Grades III to VIII, at the completion of the grade, should be able to recognize and construct complete sentences free from grammatical errors, to punctuate correctly what they write, and to make proper use of capital letters.

CITIZENSHIP—

Standard 80 percent

At the end of the sixth grade, each pupil should have to his credit 100 distinct services which he has rendered during the year to his home, the school, and the community. Each service should be counted as often as it is repeated. At the end of the seventh and eighth grades this number should be 200. Each pupil should keep a record of the services he has rendered with the frequency of each. This should be certified by the teacher. The record may be kept in a notebook or on cross-section paper. In one column should be the list of services he has rendered, and in the succeeding columns should be the dates on which these services were rendered. The following are a few examples of services which might be rendered:

Services to the home.—Washing dishes, cooking a meal, cleaning house, carrying away ashes, caring for younger children, running errands for father or mother, settling disputes between younger children, earning money to help support the family.

Services to the school.—Helping to keep clean the buildings and grounds, helping other pupils with their lessons, acting as safety patrol, running errands for the school, protesting against the breaking of windows and destruction of other property of the school, reporting specific serious offenses against the rules of the school.

Services to the community.—Keeping the alley clean; protesting against the breaking of street lights and the destruction of other public property; protesting against the damage to private property such as lawns, hedges, buildings, etc.; persuading older people to vote; studying the qualifications of candidates for public office and forming an opinion as to who is best fitted to serve the community; studying specific civic problems and forming an opinion; reporting specific serious offenses against the laws; restoring lost property to the rightful owner; running errands for older persons not members of the immediate family; helping a child or older person to cross the street; giving directions to strangers; making toys for poor children.

MUSIC—

Standard 80 percent

After the sixth grade, every public-school boy and girl should be able to stand and without hesitation render in clear tones from the notes on the staff, music of the difficulty of the "Minstrel Boy."

PROMOTION RATE—

Standard 95 percent

Special promotions and demotions will be considered in determining the promotion rate. If the pupils of the school are of average mental level, the number of extra promotions should about balance the failures.

REPORTS—

Standard 100 percent

All regular reports are expected to be correct and on time. When there is need of delay, permission should be secured from the one who is to receive the

report. Each time a report is incorrect, or late without permission, 5 points will be deducted from the standard of 100.

FIRE DRILL—

Standard 80 percent

Fire drill should be rated on the basis of the *Fire Drill Regulations:*

Paragraph		Points
198.	Frequency	7
199.	Variety	7
201.	Signals	3
203.	Emergency Signal	4
204.	Instruction in Giving Signals	9
206.	Signal to Fire Department	4
210.	Control	20
212.	Stumbling	8
214.	All Out	10
216.	Order Out of Doors	5
217.	Return Signal	4
218.	Doors and Hydrants Clear	4
226.	Inflammables	15
	Total	100

CARE OF BUILDINGS AND GROUNDS—

Standard 80 percent

One of the aims of education should be to train children to take pride in clean, attractive surroundings. School-buildings and grounds should always be kept free from dirt, papers, and rubbish of all kinds. If pupils are trained to refrain from throwing rubbish on the floor or on the grounds, and to form the habit of picking up papers and other rubbish, the buildings and grounds can be kept in good condition. Without the aid of the pupils, it is difficult to care properly for cleanliness. Even though the school is located in an unfavorable neighborhood, the grounds can be kept in good condition if pupils are sufficiently interested. Through the children the idea of cleanliness and orderliness may spread to the neighborhood. A rating on this item should include only such factors as are under the control of the principal.

The item, Citizenship, has been omitted for the present year to await the results of experiments with this kind of training. These standards may be too high. No school has reached all of them, and some schools have not reached any of them. The rank of the school, however, can be determined on the basis of its standing in relation to these objectives.

In this discussion, we are concerned with the rating of schools on the basis of efficiency in training pupils in the school subjects. Definite measuring devices have been selected from standardized tests or have been constructed to measure each of these abilities. The fundamental tests in arithmetic are short exercises containing one or two problems in each of the four fundamental operations. Separate exercises have been developed for Grades III through VIII. In arithmetic reasoning we have developed our own tests for measuring

the achievement of the pupils in Grades VI and VIII. Each test is made up of five problems; and every pupil of the grade is expected to solve at least four of them. In reading we have selected standard tests which can be secured from various publishers.

Spelling tests have been devised from our own grade lists. The words have been selected so that each of the successive tests is of the same difficulty for the grade in question. This has been accomplished by using the values of words given in the Iowa Spelling Scale. Objective language tests have been developed for measuring the ability of the pupils to use proper English. Music tests have been devised by our music department for measuring the ability of pupils in sight-singing.

We can measure in a fairly definite manner the achievements of the schools in relation to these goals; but in order to determine the efficiency of the schools, it is necessary to interpret the achievement in terms of the mental level of the pupils. For this purpose, we have given to each school a series of mental-ability tests. It has not been possible to test every pupil in school, but a sampling of three classes from a school has been taken as representative. The mental-ability level is recorded in terms of the intelligence quotient, because the tests could not be given at the same time in all schools. However, the intelligence quotient is sufficiently constant so that a difference of a few months in the time of testing does not affect the results.

The procedure in rating schools may be illustrated by a set of data in which an arithmetic test and a test of mental ability were given to the same pupils. In October, 1926, a reasoning test in arithmetic and a mental-ability test were given to the pupils of a VI-A class in each of the schools in the city. The average arithmetic score and the average intelligence quotient were computed for each school, and a frequency distribution of each of these scores was made. The arithmetic scores were transmuted to the scale of the intelligence-quotient scores by the use of the formula which Monroe has described.[1]

In this formula, we shall let

X = the score on the arithmetic test,
Y = the intelligence-quotient, and
Z = the score on the arithmetic test transmuted to the intelligence-quotient scale,

while

M_x = mean of arithmetic scores and
M_y = mean of intelligence-quotient scores.

[1] Monroe, Walter Scott. *An Introduction to the Theory of Educational Measurements.* Boston, Houghton Mifflin Company, 1923. p. 211.

When the scores of the arithmetic tests are transmuted to the intelligence-quotient scale, the distribution of the arithmetic scores and the distribution of the intelligence-quotient scores have the same mean and the same standard deviation. Therefore,

$$\frac{Z - M_y}{SD_y} = \frac{X - M_x}{SD_x}$$

$$Z = X \cdot \frac{SD_y}{SD_x} + \left(M_y - M_x \cdot \frac{SD_y}{SD_x}\right).$$

The various measures were

$$M_x = 74.38$$
$$M_y = 94.78$$
$$SD_x = 8.56$$
$$SD_y = 8.18.$$

Substituting these values in the formula just given,

$$Z = X \cdot \frac{8.18}{8.56} + \left(94.78 - 74.38 \cdot \frac{8.18}{8.56}\right).$$

$$Z = .95X + 24$$

The arithmetic score for each of the schools in the city was substituted in this formula, and the transmuted score in terms of the intelligence-quotient scale was obtained. The transmuted arithmetic score was divided by the intelligence quotient of the school in order to obtain an efficiency quotient. A school with a high average intelligence quotient is expected to have a high average arithmetic score and vice versa. If the efficiency quotient is near 100, the achievement score and the mental-ability score are about equal, and the school has developed the pupils to a point corresponding to their capacity. If the school has an efficiency quotient of more than 100, it has brought the pupils to a standard in arithmetic which is above what their mental level would lead us to expect. On the other hand, an efficiency quotient of less than 100 indicates that the school has not trained the pupils to solve arithmetic problems as well as it might have done.

Table I shows the efficiency rating of twenty-five schools selected from the two hundred and eighty schools of Chicago. Schools 12 and 13 have the same average arithmetic score, but the efficiency quotient of School 12 is 96 and that of School 13 is 106. The average intelligence quotient for School 12 is almost normal, but the average intelligence quotient for School 13 is twelve points below normal. Schools 1 and 15 have the same average intelligence quotient, but the score on the arithmetic test gives School 1 an efficiency quotient of 116 and School 15, an efficiency quotient of 92. The

pupils are of equal ability but the arithmetic scores in the two schools vary widely. Again, Schools 9 and 25 have the same efficiency quotient, yet the arithmetic score of School 9 is 77, and that of School 25 is 48. The last column in the table gives the efficiency rank for each of the twenty-five schools. School 4 is rated fourth on the basis of raw score, but is rated tenth on the basis of efficiency quotient. School 18 is rated eighteenth on the basis of raw score, but it is rated eighth on the basis of efficiency quotient.

TABLE I

EFFICIENCY RATING OF TWENTY-FIVE ELEMENTARY SCHOOLS IN ARITHMETIC REASONING

School	Average Arithmetic Score	Transmuted Arithmetic Score	Average Intelligence Quotient	Efficiency Quotient	Efficiency Rank
(1)	(2)	(3)	(4)	(5)	(6)
1	96	115	99	116	3
2	92	111	85	130	1
3	87	106	96	110	5
4	84	103	101	101	10
5	83	102	86	118	2
6	83	102	90	113	4
7	80	100	105	95	15
8	79	99	93	106	6
9	77	97	111	87	19
10	75	95	95	100	11
11	75	95	93	102	9
12	74	94	97	96	12
13	74	94	88	106	7
14	73	93	96	96	14
15	72	92	99	92	17
16	69	89	95	93	16
17	68	88	98	89	18
18	65	85	81	104	8
19	61	81	106	76	25
20	60	81	96	84	22
21	60	81	100	81	23
22	57	78	90	86	21
23	56	77	80	96	13
24	54	75	97	77	24
25	48	68	78	87	20

It is plainly obvious that an efficiency rating of these schools, on the basis of the arithmetic scores alone, is far from being accurate. Although the efficiency quotient as obtained by the formula which we have used is doubtless somewhat inaccurate, due to the limitations of the measuring devices, yet it is a much fairer

means of rating schools on the basis of efficiency than is a raw score on achievement tests.

The final efficiency rating for each school at the end of the year will be based on an efficiency quotient obtained in the manner already described. The raw achievement score will be a composite score obtained from the giving of tests in the various school subjects. The intelligence-quotient level of the school will be based on the sampling of three classes. The tests are given by district superintendents or by special teachers not directly connected with the school, and this precaution increases the accuracy of the results. This method of rating schools has met with the approval of all who have given the matter careful consideration and has proved an incentive to principals and teachers to bring their school up to normal achievement.

THE GIFTED CHILD

III. PRESENT PRACTICES IN SPECIAL CLASSES FOR THE GIFTED

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IN order to obtain further information concerning present provisions for gifted children made by schools, a more detailed questionnaire was sent to the forty-five systems which had previously reported that they maintained special classes for superior children.[1] The text of the questionnaire is given at the end of this article. A great many questions might, of course, have been asked, but only those which seemed to cover the essential points were included. The questionnaire was made as brief as possible in order to obtain a fairly large proportion of replies.

Completed questionnaires were received from twenty-eight of the forty-five cities that had previously reported special classes for gifted children. Eighteen of the twenty-eight gave most of the information requested in the questionnaire. Some of the cities, however, stated that they had no such classes or that they had discontinued them, although they had reported special classes for the gifted in their replies to the earlier inquiry. This discrepancy may be explained in part, at least, by the fact that the previous questionnaire, which was quite short, usually was filled in by the superintendent. The second one, which called for more detailed information, was more often answered by the head of the bureau of research or by some principal. The differences in points of view, characteristic of those who supplied the information, will explain most of the discrepancies between the replies to the first and second questionnaires.

Information of considerable significance was obtained through letters and from comments appended to the questionnaires. Since this type of material did not lend itself to tabular treatment, it is briefly summarized in the succeeding paragraphs.

Winnetka, Illinois.—No figures concerning gifted children are available, for gifted children are not segregated from others, but, of course, progress more rapidly.

Gloucester, Massachusetts.—Special classes were organized when the elementary schools were changed from nine grades to eight. The children did the

[1] See the previous article by the writer entitled, "The Gifted Child: II. Present School Provision for the Gifted," *Journal of Educational Research*, 15, February, 1927.

work of three grades in two years, and the class existed only in order to make the change more rapidly.

Richmond, Virginia.—Because of the crowded condition of the schools, the special classes for the gifted have been temporarily discontinued. Before they were disbanded, these classes had enrolled no more than twenty-five pupils. The required work of the grade was completed, then the class went ahead with the work of the next grade; sometimes they completed the work of one and one-half grades in one year. The work was more or less individual, and it was found unwise to keep pupils in this class for more than one year, for they felt and showed their importance. Although the bureau of research was organized before these classes were discontinued, they were under the supervision of the assistant superintendent of schools.

Chicago Heights, Illinois.—The only provision for special classes is by means of the homogeneous grouping of bright pupils in Grades VII and VIII, and through the enrichment of the course of study.

Omaha, Nebraska.—There formerly were speed classes for the gifted children in Grades IV to VIII, but since an economy wave struck the city, they have been discontinued. The pupils for these classes were selected on the basis of Binet examinations combined with school marks and teachers' judgments. The only change in the course of study was the removal of manual training from the curriculum. The reason for this change was not given.

Warren, Ohio.—X-Y-Z classes, with extra work for gifted pupils, are maintained.

Meriden, Connecticut.—Ability grouping is used, but, although minimum requirements are set for those in the lower ability group, no maximums are set for the members of the upper group. There is a bureau of research in the school system.

Oak Park, Illinois.—Attention is given to securing a balance of mental power, for "superior pupils are such because of ability to meet the demands of ideational thinking." The attempt is made to improve their reading habits, to increase their vocabularies, to develop attitudes of problem solving, etc. The pupils in the Alpha section recognize their superiority even though it is not mentioned by the teachers and principals in charge. Pupils in the Beta and Delta sections try to work up to the Alpha section and sometimes succeed in doing so. Apparently what was interpreted as special classes in the reply to the earlier questionnaire is only a form of X-Y-Z grouping.

Petersburg, Virginia.—Special classes for the gifted are not regarded as any particular solution of the problem of the gifted. They simply accelerate the child after he has finished the elementary grades.

Washington, D. C.—Because of Federal control of the city schools, changes in the school system have to await congressional action, which is often exceedingly slow. Teachers have had to provide whatever they could in the way of enrichment without having much equipment supplied.

These comments when added to the replies summarized in the tables given in this report will aid in interpretation of the findings.[1] Several of the facts summarized in Table I lead to the inference that these classes are still experiments in many of the cities. In only one school system, that of Enid, are all the grades included in the provisions for gifted pupils. In six of the eighteen cities, such

TABLE I

SUMMARY OF THE DATA REGARDING ENROLLMENT IN SPECIAL CLASSES GIVEN ON THE RETURNED QUESTIONNAIRES

Cities	Total School Enrollment	Number of Special Classes	Enrollment in Special Classes	Grades Included	Time System Has Had These Classes (Years)
(1)	(2)	(3)	(4)	(5)	(6)
Allentown, Pa.	14,000	2	80	I–IV	4
Bayonne, N. J.[a]	.....	2	.....	.....	.....
Beverly, Mass.	5,000	55	2,026	II–VI	10
Cedar Rapids, Iowa	9,200	14	403	VI–A	2
Cleveland, Ohio	140,500	11	285 125	I–VI J.H.S.	3
Enid, Okla.	4,000	12	248	I–XII	4
Everett, Wash.	6,700	2	62	VIII	3.5
Jackson, Mich.	7,800	1[b]	30	III–IV	5
Los Angeles, Calif.	150,000	5	150	III–VIII	4
Louisville, Ky.	.....	2	40	V-B–V-A	7
Norfolk, Va.	21,900	2	60	II–V	5
Oak Park, Ill.	8,800	10	2,100	IV–VIII	5
Petersburg, Va.	5,600	2	.....	VII	4
Providence, R. I.	43,900	26	1,000	V–VIII	3
Santa Rosa, Calif.	2,700	1	60	III–VI	4
Schenectady, N. Y.	17,800	2	55	V–VI	1
St. Paul, Minn.	36,400	4	100	V–VI	3
Washington, D. C.	67,200	6	177	I–VII	2

[a] Classes were still in the experimental stage when the questionnaire was returned.
[b] There have been also, for three years, three so-called "opportunity classes," for pupils of Grades V and VI which have a total enrollment of 108.

provision is made for the pupils of only one or two grades. Only two cities have maintained such a scheme for more than five years, while the majority of the classes have been organized within the last four years. Other classes, mentioned as having been formerly arranged, have for some reason been discontinued. The experimental character of this provision is further indicated by the small

[1] The reply from Fresno, California, was received after the tabulations were completed.

number of classes for gifted children maintained, in many of the larger cities, in proportion to the total school enrollment. On the other hand, where there are a great many classes, in proportion to the total enrollment, the standards for admission must be necessarily low. Few of these systems are attempting to provide for all gifted children in their schools, and some do not contemplate such provision. The number of children per class varies from five to forty, usually with only one teacher, but sometimes there are other teachers giving instruction in special subjects.

In few cases are the criteria for the selection of the teachers of these special classes definite and objective. The following tabulation summarizes the requirements set:[3]

Superior ability and training	Cleveland, Everett, Los Angeles, Petersburg, and Santa Rosa
Ability to give tests	Oak Park
Normal graduate and five years of experience	Allentown
Cultural background and psychological training	Washington
Temperamentally fitted	Jackson
No special qualifications required of teachers	Beverly, Cedar Rapids, Enid, Louisville, Norfolk, Providence, and St. Paul

There seems to be some tendency, however, toward requiring a familiarity with educational psychology and mental and educational testing. Extra compensation is given to the teachers of special classes for the gifted in two of these cities, Oak Park and Santa Rosa.

The methods of selecting the teachers for these special classes are not uniform.[4] The various persons concerned in making the choice are:

Principal	Beverly, Everett
Supervisor	Los Angeles
Supervisor and research director	Washington
Principal and supervisor	Norfolk
Superintendent or assistant superintendent and principal	Enid, Petersburg
Superintendent or assistant superintendent	Louisville, Providence, Santa Rosa, Schenectady

[3] Schenectady gave no answer to the question regarding the specific qualification required of the teachers.

[4] In reply to the question, "Who selects these teachers?" Allentown replied, "By consultation," and Cedar Rapids, "From the regular corps."

Superintendent or assistant superintendent and supervisor	Cleveland, Jackson
Superintendent and research director	Oak Park
Psychologist and school department	St. Paul

Usually the school psychologist or the head of the bureau of research is not consulted in the selection of these teachers. Sometimes the teacher stays with the class for only one year, sometimes for two years or more.

Twelve of the eighteen cities have bureaus of research, which are in more or less close connection with these special classes. While the director seldom aids in the selection of teachers, he frequently supervises the classes directly or indirectly. Such a contact is probably quite desirable since the direct supervision is usually in the hands of the building principal. A summary of the different schemes of direct supervision follows:

Building principal	Beverly, Cedar Rapids, Enid, Everett, Louisville, Oak Park, Petersburg, Schenectady
Supervisor	Allentown
School counselor	Santa Rosa
Assistant director of research	St. Paul
Building principal and supervisor	Cleveland, Norfolk
Building principal and assistant superintendent	Providence
Supervisor or assistant supervisor and research director	Jackson, Los Angeles
Building principal and research principal	Washington, D. C.

Intelligence tests are the most generally used method of selecting gifted children for special classes. The combinations of information, used in determining the pupils who shall be included in these classes, are given in Table II. A questionnaire study described by Lee shows in more detail the methods used in selecting gifted children for special classes.[5] The tendency to use several criteria instead of only one or two is undoubtedly a step in the right direction.

[5] Lee, A. Scott. "The Selection of Gifted Children for Special Classes," *Elementary School Journal*, 29: 190-98, November, 1925.

In no case does the length of the school day for the gifted differ from that of other pupils. The facts regarding equipment and curricular prescriptions are given in Table III. No special equipment is supplied in nine cities,[6] while in eight others more books, maps, tables, and chairs are mentioned. In two cities such equipment as a piano, a victrola, or both are supplied. In a few cases, tables and chairs are used for school furniture instead of the regular

TABLE II

METHODS OF SELECTING GIFTED PUPILS

Cities	Group Intelligence Tests	Individual Binet Tests	Achievement Tests	Teachers' Judgments	School Marks
(1)	(2)	(3)	(4)	(5)	(6)
Allentown	x	.....	.....	.....	x
Bayonne[a]	.....	.....	.....	.....	.....
Beverly	x	.....	x	x	x
Cedar Rapids	x	.....	.....	.....	x[c]
Cleveland	x	x	.....	.....	.....
Enid	x	x	x	x	x
Everett	x	.....	x	.....	.....
Jackson	x	.....	[d]	x	x
Los Angeles	x	x	x	x	.....
Louisville	.....	x	x	x	.....
Norfolk	x	x	x	x	x
Oak Park[b]	x	x	x	x	x
Petersburg	x	.....	.....	x	x
Providence	x	x[c]	x	x	x
Santa Rosa	x	x	x	x	x
Schenectady	x	.....	x	x	.....
St. Paul	x	.....	x	x	x
Washington	x	x	x	x	x

[a]. These classes were still in the experimental stage when the questionnaire was returned.
[b]. Anatomical and sociological ages are also considered.
[c]. In some cases.
[d]. Achievement tests are sometimes used.
[e]. In certain subjects of the preceding grades.

desks. Cleveland's provisions are the most liberal for they include all the different sorts of equipment mentioned.

It would be extremely interesting and valuable to have detailed information concerning the changes in the curriculum which have been made in organizing special classes for gifted children. The

[6] Since no entry is made on this item for Bayonne in Table III it is included in this numbering.

TABLE III

EQUIPMENT AND COURSE OF STUDY FOR THESE CLASSES

Cities	Special Equipment	Additional Subjects	Purpose of Instruction	Is Teacher Allowed Freedom?
(1)	(2)	(3)	(4)	(5)
Allentown	Yes	No	Speed, enrichment	Yes
Bayonne	.....	.....	.....	.....
Beverly	No	No	Speed	Yes
Cedar Rapids	No	No	Speed	Yes
Cleveland	Yes	French, art, projects, typewriting	Enrichment, special curriculum	Yes (almost unlimited)
Enid	No	No	Speed, enrichment	Yes[e]
Everett	No	Algebra, geometry, English Latin[b]	Enrichment, special curriculum	Yes
Jackson	Yes	History and geography correlated	Speed[e]	....[f]....
Los Angeles	Yes	Modern languages and algebra, drill subjects	Enrichment	Yes
Louisville	No	French	Enrichment	Yes
Norfolk	No	No	Speed, enrichment	Yes
Oak Park	Yes	More reading	Speed, enrichment	....[f]....
Petersburg	Yes[a]	Domestic science and manual training postponed	Speed	....[f]....
Providence	Yes[a]	No	Enrichment, special curriculum	Yes
Santa Rosa	No	No	Speed, enrichment	....[f]....
Schenectady	Yes	More history, literature, and science	Speed, enrichment	Yes
St. Paul	Yes	History, algebra, and general sciences added	Speed, enrichment	....[f]....
Washington	No	No	Speed, enrichment[d]	Yes

[a]The provisions are rather limited evidently, for the statements in the returned questionnaires were guarded, "very little" and "not much."
[b]Subjects different from high-school work.
[c]In opportunity class (see footnote b, Table I) the purpose is enrichment.
[d]Special curriculum is the goal.
[e]Pupils must cover the work of the grade, they may then skip grades.
[f]Regular work must be covered, then freedom is allowed.

replies to this questionnaire indicate the variety of them and lead to the inference that these changes have generally been additions rather than subtractions. More reading and a modern language, usually French, as well as more work in music and art, are commonly mentioned. As might be expected, there is no consistency, as yet. This fact is not to be wondered at since there is so much disagreement as to what any curriculum should include. The present lack of uniformity of the course of study in such special classes is rather to be approved than deplored, for it may show us how such classes should be conducted.

The aims attributed to the instruction of the special class are speed, enrichment, and special curriculum. Combinations of two of these are the most common, as is indicated by Column *4* of Table III. Some idea of the extent to which the teacher is bound by the city's course of study may be obtained from the last column of this table. The present era of experimental classes will, it is hoped, give way to definite plans of providing for children who deviate upward from the average, and it is to be hoped that the formulation of these plans will be such as to leave considerable freedom for the teacher and the pupil. Where can individuality better be allowed leeway than in provision for gifted children?

Even though it is rather difficult to obtain accurate information regarding the status of this recent movement in education—since school superintendents and directors of research cannot afford to put all their time to answering questionnaires—such information as is available is encouraging to the student of psychology and education who hopes for more adequate provision for individual differences in our school systems. While no system has yet been able to devise really adequate provision, there is much interest shown in the problem, and the experiments now in progress in many parts of the country point to constant improvement in our methods of providing for the gifted.

QUESTIONNAIRE ON SPECIAL CLASSES FOR THE GIFTED

1. What is your total school enrollment?.....
   Enrollment in grades .....
   In high school? .....
2. How many special classes for the gifted have you?.....
3. From what grades are pupils taken to form such classes?.....
4. Do you attempt to provide for all gifted children in your school system by means of such classes?.....

5. If not, do you contemplate such provision?.....
   When?.....
6. Total enrollment in special classes?.....
7. About how many in each class?.....
8. How many teachers of such classes have you?.....
9. Do you require special qualifications of training or experience for such teachers?..... If so, what?.....
10. Is extra compensation given teachers?.....
    If so, how much?.....
11. Who selects the teachers for the gifted?.....
12. Does the same teacher stay with these classes for more than a year?.....
    If so, for how long?.....
13. Does the length of school day differ from that of other pupils?.....
14. Is any special equipment supplied for special classes for the gifted?.....
    If so, please list.....
15. Have you a bureau of research in your school system?.....
16. If so, is the director of said bureau in charge of these classes?.....
17. Are the teachers of these classes under the supervision of the building principal, or of someone in charge of all these classes?.....
18. If there is a supervisor of these classes, please give his name.....
19. How long have you had special classes for the gifted?.....
20. Have you had such classes and discontinued them?.....
    If so, why?.....
21. How are pupils selected for these classes:
    a. Group intelligence tests?.....
    b. Achievement tests?.....
    c. Individual Binet examinations?.....
    d. Teachers' judgments?.....
    e. School marks?.....
    f. Some other plan?..... Please describe.....
    .....
22. Do gifted children study the same school subjects as do other children?....
    If not, what subjects have been added?.....
    Subtracted?.....
23. In your special classes, is the aim to:
    a. Cover the same work as in regular classes, but in less time?.....
    b. To enrich the course?.....
    c. To give these pupils a special curriculum more suited to their needs than is the regular one?.....
24. Is the teacher given a great deal of freedom in her work with the class?....
    Or, must she adhere rather closely to the regular school curriculum?.....

EDITORIALS

LEADERSHIP IN RESEARCH

On one or two previous occasions, we have pointed out that the supposed superior advantages of certain progressive policies have failed of realization when adopted because it has been thought that these advantages would work automatically. Arguments have been made for smaller classes, grouping of pupils, platoon schools, junior high schools, junior colleges, exploratory courses, special supervisors, incidental promotion, one grade per teacher, one subject per teacher, pupil self-government, supervised study, and so on. No doubt these arguments, as arguments, are good; we have made them ourselves. Yet every one of them is based upon the assumption that intelligence, good will, and effort will be substantially as evident under the new conditions as under the conditions which they supplant.

Is not this where supervision must play its part? We have heard much talk about the precise boundaries between administration and supervision. Conceivably these functions cover much the same ground yet do so in quite distinguishable ways. The study, for example, of buildings, budget, pupil enrollment, and teaching staff as they condition size of class; the adjustment of any or all of these conditions to the end that class-size may be modified; and the actual change in the number of pupils per teacher—these are administrative matters. But when the change has been made, the follow-up to see that the change is beneficial in the classroom is supervision. Thus supervision is suggestion, stimulation, motivation. It works with teachers and pupils rather than with physical facts and figures. It is personal; it involves human relationships. Leave supervision out, and you can no more secure educational advantages than a plan of campaign can win a battle.

We have lately become acquainted with a study of departmental teaching. A school was divided into two parallel groups whose members were of equal ability. For a year one was taught according to the departmental plan, the other according to the grade plan. At the middle of the year the schools exchanged teachers, so that for

the year taken as a whole the same teaching talent was available for both schools. The progress of pupils was measured by a rather extensive battery of standardized tests, administered at the beginning and end of the year.

Now, we are under no delusion as to the sufficiency of this experiment or of the measuring instruments. The pupil taught all his subjects by one teacher may secure advantages not recorded or recordable by standardized tests. On the other hand, the particular benefit which departmental teaching has to confer may lie outside of and beyond the scope of the tests. Yet no small part of the effort and money expended in furnishing schooling for children in the fifth, sixth, seventh, and eighth grades is intended to produce tangible results in reading, arithmetic, spelling, and language. Certainly any system which does not do this better than another system will, if it is to establish its superiority, have to rest its case upon extra-curricular achievements.

The results of the experiment to which we refer showed about a forty percent superiority for the grade plan of teaching. Stated in this unqualified manner, the fact, though undoubtedly true, is misleading. For one thing, the school in question was abruptly changed from the grade organization under which it had been operating for many years to a departmental organization which it had never employed. Doubtless, a year was too short a time in which to expect the new organization to exhibit its real strength. The data showed unmistakably the existence of a period of adjustment. Yet, on the other hand, when a check experiment was made with the same teachers and pupils the next half-year, it was by no means clear that the recovery from the adjustment period was sufficiently rapid to ensure an ultimate victory for departmental teaching.

To our mind, these data prove nothing as to the inherent superiority of either grade or departmental teaching. The real story they tell is the same story that has been so often told about other administrative measures. They will not run themselves. If departmental teaching is to be introduced, it is supervision that counts—supervision alert, penetrating, sympathetic, and personal. It begins with careful planning. It includes a wise selection of teachers. It contemplates a campaign of teacher training in service. It exalts mastery of the particular subject in which each teacher is to offer instruction. It affords opportunity for expertness in that subject. It sets a premium upon a special expertness in teaching the particular subject. It offers the teacher a chance to exercise choice in

materials and initiative in method. It advises when advice is wanted, it criticises when criticism is needed, it encourages when effort flags.

Old ways—ways that are familiar—are best ways if things are to be left without guidance. Put no faith in new devices unless you put brains and effort into them, too. Whether it is departmental teaching or standardized tests or college-entrance examinations the scheme, no matter what its possibilities may be, will, if allowed merely to take its own course, pay naught but "dividends of disappointment."

B. R. B.

NEWS and COMMUNICATIONS

Creative Expression through Music and *Creative Expression through Art* are the titles of two volumes recently published by the Progressive Education Association. They give an idea of the types of creative art and music in the public schools throughout the United States.

The 1927 Schoolmen's Week will be held at the University of Pennsylvania from March 30 to April 2. This is the fourteenth annual meeting, and it promises to have quite as many interesting addresses on its program as there have been on the programs in past years.

Forum is endeavoring to stimulate the growth of American language by offering a prize for new words which ought to be added to our dictionaries during the next ten years. Those interested should consult the issue for February, 1927, pages 265-68.

The Horace Mann School of Teachers College, Columbia University, celebrated its fortieth anniversary during January. Dr. N. M. Butler, who is now the President of Columbia, was the first principal of this school.

The Second Annual Conference on the Problems of Secondary Education will be held at the Faculty Club of the University of Pittsburgh on Friday, April 22. Professor H. C. Morrison, of the University of Chicago, will be the principal speaker.

The World Book Company has recently issued a Foods Test devised by Florence B. King, Home Economics Department, and Harold F. Clark, School of Education, of Indiana University. Each form of the test consists of sixty items involving the multiple-choice technique. Tentative norms are given for Grades VI-XII, inclusive.

The Iowa Child Welfare Research Station, University of Iowa, announces the summer courses in Child Development and Parent Education, June 13 to July 22, 1927. These courses include nutrition, child psychology, child in the home, child study and parent education, and teaching in free schools. Any one interested should write to Dr. Bird T. Baldwin, director of the Station, Iowa City.

"The University Review—A Summary of the Current Literatures in Higher Education," is a mimeographed bulletin which the Division of Educational Reference at Purdue University is issuing monthly. Dr. F. Dean McClusky, director of the Division, states that its purpose is to develop consciousness in the faculty of a large state university, and that it has already met with enough success to warrant giving the idea some publicity.

The *Public School Bulletin* of Providence, Rhode Island, gives, in the issue for December, 1926, a reproduction of a new permanent test-record card with an explanation of it. The card provides for recording the scores of individual children in arithmetic, reading, language, composition, history, science, and civics in a graphical manner, easily translated into the regular marking system.

The Industrial Arts Cooperative Service is a group of teachers working in progressive elementary schools for the purpose of mutual helpfulness. The secretary, at 519 West 121st Street, New York, has a collection of materials and studies, contributed by members of the organization, which are available as service to others.

The results of an investigation of industrial misfits by authorities in thirty-seven different industries and professions have been brought together in a book, *An Outline of Careers*, soon to be published by the George H. Doran Company, New York. The section on education is written by Joy E. Morgan, editor of the *Journal of the National Education Association*.

The State University of Iowa dedicated, on January 14, its new field house which is said to be the largest of its class in the world. It is 464 feet long, 430 feet wide and has an average height of 60 feet. It has a swimming pool 60 by 150 feet in size, a track of six laps to the mile, and a football field of standard dimensions; a real baseball diamond and space for eight regulation-size tennis courts. Locker and shower space is provided for five thousand students.

Frank S. Salisbury, director of the Bureau of Research in the State Normal School at Bellingham, Washington, reports the results of an inquiry addressed to 180 Freshmen and 82 Sophomores on the best form of response to true-false test items. The responses indicate that the students prefer to use the same form of answer in all their classes and that they prefer writing "OK" when the statement is true and "X" when the statement is false.

The November issue of the *Child Health Bulletin* published by the American Child Health Association of New York City contains an article by Emma Dolfinger on "Health Instruction in Normal Schools and Teachers' Colleges." The article emphasizes the fact that teachers' colleges are vocational schools which are of superior importance because the quality of teaching service rendered the oncoming generation is dependent upon these schools. Hence, the health instruction in courses and the health work in a demonstration school need major emphasis. The article is well written and highly suggestive.

A set of diagnostic tests and remedial exercises in punctuation by Dr. Walter S. Guiler, of Teachers College, Miami University, has recently been published by Rand, McNally Company. By means of an analytical study of the writings of more than seventeen hundred children in the school grades, twenty punctuation usages were found to occur frequently enough to warrant special emphasis on the part of the teachers. These have been distributed through Grades II to VI as objectives appropriate to children of those grades. The tests and exercises lend themselves to easy scoring and interpretation.

Trends of School Costs in Ohio is the title of the third number in the "Contributions in School Administration," published recently by the Ohio State University Press. It was written by Dr. Ward G. Reeder with the assistance of one of his graduate students, Mr. E. A. Paisley. The monograph presents in detail the increase in expenditures, the causes of the increases, and the increase in ability to pay on the part of the state. Perhaps the outstanding facts are that in the period from 1870 to 1924 the cost of education increased 1,463 percent, considered in terms of dollars without respect to their purchasing power. On the same basis, the wealth of the state had increased 354 percent to 1922, the latest date for which material was available.

E. C. Witham, director of research, Wilmington, Delaware, has recently issued a mimeographed bulletin comparing education in Wilmington with fourteen other cities of approximately the same size. Length of term; number of supervisors and principals; number of teachers; enrollment; average daily attendance; night, summer, and Americanization schools; revenue; and expenses are worked out in terms of actual numbers and in index numbers. On thirty of the thirty-nine school items, Wilmington is less than average; on twenty-nine of the thirty-six financial items it is also less than the average. The report closes with this significant statement, "If the schools are to be curtailed, less money is needed; if the schools are to be brought up to standard, more money is necessary."

The Idaho State Teachers Association is backing an amendment to its present laws regarding the qualifications for third-grade certificates for teachers. The most significant portion of this proposed amendment is as follows:

It is further provided that after September 1, 1927, no person may become an applicant for a third-grade certificate who shall not have had one year's normal-school work; and Provided, further, That after September 1, 1929, no person may teach in the elementary schools who has not had at least two years' normal-school work; Provided, further, That this requirement shall not apply to any one who has taught at least eighteen (18) months prior to September 1, 1927. A third-grade certificate is not renewable.

Two international educational conferences which will be held in Europe this year, and which may be of interest to our readers, are briefly outlined here.

Prague Conference.—The International Bureau of Education at Geneva has arranged to convene an international educational conference to be held at Prague, Czechoslovakia, on April 18 and 19, 1927. This conference is called

to discuss "What the school can do for peace." Numerous educators in Great Britain—particularly in Wales—France, and Germany have been giving especial attention to this subject, and it was made the theme of a remarkable conference at Geneva last summer. It is expected that the Prague Conference will be attended by delegates from every country of central and western Europe and, possibly, from the United States and other countries.

Locarno Conference.—The Fourth International Conference of the New Education Fellowship, a progressive educational organization with branches in England, Germany, Switzerland, Bulgaria, Hungary, Belgium, Denmark, France, and the United States, will be held in Locarno, Switzerland, from August 3 to 15, 1927. The main topic of discussion will be "the true meaning of freedom in education." One of the questions which will be taken up under this general topic concerns closer educational relationship between Europe and the United States. American educators traveling in Europe are cordially invited to attend the meeting.

Further information concerning these meetings can be secured from Mr. C. H. Williams, secretary of the World Federation of Educational Associations, 101 Jesse Hall, Columbia, Missouri.

Prof. E. D. MacPhee of the University of Toronto has prepared a *Syllabus of Lectures on Educational Psychology* which is unusual, for it comprehends not merely a conventional course but rather the whole field of the subject. Evidently Professor MacPhee conceives the development of new lines, such as intelligence measurement and the psychology of the school subjects, to indicate an extension rather than a shifting of the field of educational psychology, for in addition to these topics and those of learning, the neurological, biological, and evolutionary bases of behavior are included. It is interesting, too, to see a section devoted to educational research. Each topic, moreover, is given both theoretical and practical consideration. The whole outline presents an exhaustive survey of the field of educational psychology, logically integrated and free from overlapping. It is intended to cover the educational psychology considered necessary for the student preparing for a doctorate in education, and it seems to us to fulfill this condition very well indeed.

A series of three studies on educational finance in Mississippi, compiled by M. E. Moffitt, director of Information and Statistics, and Mrs. J. W. Broom, has recently come to us. County, rural, and consolidated schools are taken up in the first study; cities having a population of ten thousand or more, in the second; and cities of from five thousand up to ten thousand, in the third. The studies give information for the white race, only, on number of teachers, average salary per month, per capita cost, length of term, assessed valuation, levies, and expenditures for certain designated categories. Among the striking facts revealed are the following: average salary among counties for rural teachers, $73.05 per month; in cities of more than ten thousand, $124.61; in cities from five thousand to ten thousand, $122.59. The length of the school term in all cities is 180 days but in rural schools of the eighty-two counties it was 125 days average, with a variation from less than 120 days in twenty counties to 180 days in three counties. These terms apply only to the free

school term, while many schools ran longer on funds derived from local taxation or public subscription.

The third general meeting and the second biennial session of the World Federation of Education Associations will meet in Toronto, Canada, August 7-12, 1927. Special objectives of the organization are:

1. To promote friendship, justice, and good will among the nations of the world.
2. To bring about a world-wide tolerance of the rights and privileges of all nations regardless of race or creed.
3. To develop an appreciation of the value of inherited gifts of nations and races.
4. To secure more satisfying information and more adequate statement of facts for textbooks used in the schools of the different countries.
5. To foster a national comradeship and confidence which will produce a more sympathetic appreciation among all nations.
6. To develop the consciousness of an international morality in the minds and hearts of the rising generation.
7. Finally, throughout the world, in all schools, to emphasize the essential unity of mankind and the evils of war and to develop a psychology of peace, together with a true patriotism based upon love of country rather than upon hatred of other peoples and countries.

There is always more or less argument about the effect of student-teachers or practice teachers in any community in which the schools are used for training purposes by an educational institution. Studies such as the one reported by Dr. Carl G. F. Franzen, in the "Bulletin of the School of Education, Indiana University" (Volume II, No. 4) gives some definite information on the subject. The title is *A Comparison of the Results Made on Certain Standardized Tests by Pupils in the Bloomington High School Who Were Taught in Classes of the Same Grade by University Student-Teachers and by Regular High-School Teachers.* While general conclusions are limited by various factors, it is evident "that those pupils in the classes that were measured, and in respect to the things measured by the tests used, are doing, in practically all cases, just as well under student-teachers as they are under regular teachers." It was also evident that "student teachers go at this work with a real sense of responsibility and that pupils receive possibly more help than they would were there no student-teachers in the school."

We are reproducing herewith two letters which were inspired by the editorial in the December number.

In reply to your editorial questions in the December number of the JOURNAL OF EDUCATIONAL RESEARCH, I venture to suggest that the cause of apathy, not only of the "laity" (a detestible usage) but of the profession, toward much of the so-called, "educational research" is perennial disappointment through failure to glean anything of real merit from the long and tedious articles which, even under intriguing titles, prove to be but academic pedantry, camouflaged behind pseudo-technical lingo, in a strained effort, not to give real information, but to get into print or to satisfy the undiscriminating demands of institutionalized scholarship.

The practice of a few of the best scientific journals, of requiring their contributors to submit a brief, intelligible summary in well-established language, representing the final "conclusion of the whole matter," is certainly a boon to the busy, serious reader.

There is a very characteristic tendency in the field of education, particularly, to undue prolixity and often "sciosophistic" palavering.

An imposing repertoire of technical conventionalisms and Greek or other lettered symbols and formulas is in no sense a guarantee of erudition or profound insight; rather, like the noisy and spectacular whitecap, it is an index of shallowness or rockbound limitations. Most authors take too many presumptive liberties with their readers. When symbols or abbreviations are used they should, if intended for the general reader, be parenthetically explained. There is, in fact, little need for many "technical" expressions, and only rarely does an honest-to-goodness idea call for new terminology. That periodical is fortunate which succeeds in capturing one or a few fundamentally new ideas or expressions during a year. The mad scramble to produce something "new," if nothing more than a name, has developed almost to a mania, a *nomophobia*, that is more appropriately described as counterfeiting than as coinage.

While I have my typewriter at hand, I am tempted to free my mind of some things which have been circulating around there for some time and which have been precipitated by your editorial in the Journal, "Are We Too Highbrow?" While I have as little use as anybody for the notion that a thing is valuable only in proportion to its difficulty or that the "pure" scientist has no responsibility to make his researches intelligible, I am wondering if it be not possible to swing to the other extreme and overemphasize the value of the simplified. Take, for example, this question of the technical vocabulary of educational journals—to be specific, take the JOURNAL OF EDUCATIONAL RESEARCH. This journal is the official organ of an association all of whose members can be assumed to have had quite a bit of technical training. And, is it not true that a very large proportion of its readers, other than the members of the E.R.A., have had some professional training, and that this proportion is getting larger? If technical terms are to be eliminated largely from the Journal, then would not the same logic favor eliminating them from professional courses in education? Where shall the process stop? Shall we insist that all university courses be taught in terms of the high-school pupils' vocabulary? If rather, laying the customary cynicism aside, the function of language is to convey thought; and if a technical term will, when learned, make for greater clearness and brevity—and, of course, that is the only condition for which I am arguing—is it not desirable to employ that term, and to teach the use of it? Furthermore, is it not reasonable to suppose that any person who is fit to direct public education, even a college president, should have the ability and the willingness to understand those terms which refer to those particular phases of work with which he is concerned? My point is, instead of considering the elimination of technical terms from our journals, why should we not see to it that each person who leaves a college of education can understand such terms?

And, the matter of simplification as to vocabulary is not the only thing that is troubling me; indeed, I had not thought much about that until I read the editorial mentioned. I am thinking of this whole business of minimum essentials in history, geography, etc. We are told of the 175 items of place geography, etc., etc. Assuming that such essential items can be found, is there not danger that we will proceed to teach them in their bare isolated form—feeding them to pupils like so many concentrated food pills, without the necessary (?) roughage to go with them? Or, to use a better figure, should we not recognize that in the building of an education as in the building of a sky-

scraper, there is the need of a lot of scaffolding? As we build up from story to story we have to use much material whose purpose is temporary but without which the permanent structure is impossible. And this staging material has to be *tested*. It must be able to bear the weight of men and lumber during the process of construction. Now, is there any danger that in our search for minimum essentials we are thinking only of the building and forgetting to include the scaffolding? And in any event, ought we not to distinguish which material is for which purpose and make our tests accordingly?

The editors are still wondering, "Are we too high-brow?"

The Ohio College Association is sponsoring, during the academic year 1926-27, a research program involving some forty Ohio colleges and normal schools. Forms 9 and 10 of the Ohio State University Intelligence Test have been given to more than thirteen thousand college and university Freshmen. At the Ohio College Association meeting last April, the association voted to collect twenty-five cents from every entering student of each college in order to raise a research fund of $2,000 for carrying on research within these colleges. Research plans for the coming year include the giving, in more than twenty Ohio colleges, of a newly constructed test called a Study-Performance Test, a following-up and elimination study of some eleven thousand Freshmen similarly tested last year, research on reading habits of college students, and a study of the quality of entering Freshmen according to the high schools of the state from which they came. The new Study-Performance Test contains tests on speed of reading; note-taking ability; determining the relative importance of ideas in a paragraph; difficult mental comprehension; abbreviations, foreign words, and phrases necessary for text-book reading; questionnaire on study habits; the Minnesota Academic Interests Test; and a questionnaire on the incidental reading of books. The committee in charge of research has issued seventeen mimeographed bulletins dealing with testing problems, and a number of others are in the process of preparation.

The Twenty-sixth Annual Report of the Director of Education for the Philippine Islands is a volume of 160 pages filled with data on the school situation there. Among the major headings considered are "Administration," "Supervision," "Elementary and Secondary Schools," "Educational Measurement Research," "School Expenditures," and "Legislation Secured and Desired." The Bureau of Achievement Tests endeavored to get a cross-section of the situation by giving tests in arithmetic, reading, language, and dictation. General medians and best school situations are emphatically pointed out. The volume contains a large amount of data of interest to school administrators in the United States proper.

Dr. Fowler D. Brooks calls our attention to an error in the review section of the December, 1926, issue of the Journal, page 388. "For instance, not one of these three new books mentions the Report of the National Committee on Reading, a 300-page volume published in February, 1925." This volume is referred to in three different places in the book, *The Applied Psychology of Reading*, and is listed in the bibliography under "National Society for the Study of Education."

Miss Bertha M. Rogers, director of Measurements of Elementary Schools in Janesville, Wisconsin, reports a testing program for the present year which includes some testing work in each month from September until April. Intelligence tests in all grades, and reading, arithmetic, handwriting, and composition tests in most grades, make up the program. A very fine report of Miss Rogers' statement of the purpose of the measurement work in the local schools was given in the Janesville *Daily Gazette* after she had presented her program to the Board of Education. Testing, analysis of results, and revised teaching procedure—on the basis of the results—are the outstanding characteristics of the work as reported.

The Committee on College Admission of the North Carolina College Conference recently issued a mimeographed report of the results of the use of standardized tests with high-school Seniors in the schools of that state. The tests used were the Iowa Comprehension Test in reading, and the Thorndike Test of Word Knowledge. The tests were given near the close of the school year by the high-school principal, and papers were examined and marked by departments of education at the colleges which are members of the Conference. The general handling of the material was directed by the Bureau of Educational Research at the University of North Carolina, of which one of our members, Dr. M. R. Trabue, is director.

Returns were received from nearly 9,000 Seniors in 482 schools. Among the interesting results are the following: (1) "The median (average) pupil tested was in a high school having 23 Seniors, while the median high school tested had 15 Seniors." (2) "There are tremendous differences in the average results being obtained in English by the different high schools of the state. In vocabulary, for example, the senior classes of three high schools were typical of sixth-grade pupils, twenty schools were below the national average for seventh-grade pupils, yet an equal number of schools showed average scores that would do credit to upper classes in standard colleges." (3) "Only 26.7 percent of the Seniors who applied for admission to our colleges this fall were able to reach the median score of Freshmen in the University of Iowa on the Iowa Comprehension Test."

REVIEWS

BENSON, CHARLES E., LOUGH, JAMES E., SKINNER, CHARLES E., AND WEST, PAUL V. *Psychology for Teachers.* Boston, Ginn and Company, 1926. x + 390 pp.

The number of textbooks in educational psychology which have appeared recently is, on the whole, to be welcomed rather than deprecated. Few are agreed as to the best division of the line between psychology and educational psychology, on the one hand, and between educational psychology and the technique of teaching, on the other. There is little agreement as to the best topics to be discussed or the best plan of organization of such books. Furthermore, the requirements of various institutions are such that a textbook which is thoroughly adequate for one is totally unsuitable in another. We may, therefore, welcome *Psychology for Teachers* as the latest edition to the textbooks available for use in the field of educational psychology.

This book is somewhat unique, for it represents the combined efforts of four psychologists connected with New York University, although the actual writing of the book was done by only one of the group. The material is presented in short sentences with so much conciseness and absence of connecting words and phrases as to raise the question whether the student will not find it difficult to follow. The writing in most books is too prolix, but the writer of this one seems to have gone somewhat too far in the opposite direction.

The book starts appropriately with a chapter on how to study. The order of topics is, for the most part, similar to that most frequently followed in writing texts on psychology. Chapters, however, have been included on "The Autonomic Nervous System," "Play and Learning," "Mental Efficiency," "Mental Hygiene," and on mental measurements because of their especial interest to students of education. A lengthy appendix contains exercises for review, suggestive problems for further study, suggestions for examinations, and topics for term reports. No space is given to the psychology of the school subjects as such, since the authors hold that such material is more appropriately presented in connection with special method courses.

E. H. CAMERON

University of Illinois

BOBBITT, FRANKLIN, AND OTHERS. *Curriculum Investigations.* Chicago, University of Chicago Press, 1926. 204 pp. (Supplementary Educational Monograph, No. 31)

What should be taught in our public schools? This is a major educational issue which faces all groups of educators from kindergarteners to university presidents. In this monograph Bobbitt states:

Civilization is a system of activities . . . . The business of education is to teach the growing individuals, so far as their original natures will permit, to perform efficiently those activities which constitute the latest and highest level of civilization. . . . . Our first task is to find out with definiteness and certainty what these activities are.

The studies of twelve authors, which are assembled in this monograph, indicate the nature of the problems to be investigated and make initial contributions to the discovery of life's activities at their best. Evidence as to the major fields of present-day human concern is presented through a classification of eleven thousand topics in the *Reader's Guide to Periodical Literature*, covering the years 1919-21; through an analysis of the articles devoted to various topics in six months' issues of the *New York Times;* through an analysis of 7,370 of *The Encyclopedia Britannica;* and through a tabulation of the 40,000 topics treated in the *Literary Digest*, during the past thirty-five years.

Such open-minded, painstaking, detailed, as well as extensive scientific investigations, make one hopeful that as time goes on "minimum essentials" will be discovered, and curricula will be built which will function more completely in modern life. The purpose of these investigations is to gain for the curriculum builder a deeper understanding of life—a knowledge of those activities which make for more abundant living. When these are determined and graded to fit children of various age levels, teachers will have the materials through which to interpret life more accurately.

To determine the objectives of civic education was the purpose of one study included in this monograph. The investigator collected and analyzed 8,541 statements relative to the duties and traits of a good citizen. Another investigator analyzed 11,233 statements of civic and social shortcomings. Likewise, twelve thousand pages of material dealing with labor problems were analyzed to discover the social problems of the labor group. An analysis was also made of eighteen volumes of outstanding essays to determine what qualities of human conduct are most frequently praised and condemned. Such investigations are bound to come closer to revealing truth than are statements which are merely the opinion of one author.

Other studies in this volume which will be of interest to curriculum builders deal with shortcomings in the written English of adults, mathematics used in popular science, the play activities which are normal and good for each of the ages of the growing individual, and the placement of poems in the grades.

As Bobbitt clearly states, wider study of all the problems raised is needed before final conclusions can be formulated; each study presents abundant opportunity for further investigation. These initial contributions, however, are of interest to all curriculum builders. Their value lies in the fact that from them we tend to obtain impersonal evidence concerning *what materials are of use* in life's activities. We tend to discover what specific materials are used in the constructive things right-minded citizens do. According to Bobbitt, these investigators give the curriculum maker relatively impersonal evidence concerning particularized objectives to be sought in our public schools.

MARGARET M. ALLTUCKER

Research Division, National Education Association

WASHBURNE, CARLETON W., VOGEL, MABEL, AND GRAY, WILLIAM S. *A Survey of the Winnetka Public Schools.* Results of Practical Experiments in Fitting Schools to Individuals. Bloomington, Illinois, Public School Publishing Company, 1926. 135 pp. (Supplementary Educational Monograph, Journal of Educational Research)

This book is neither a defense of the Winnetka plan nor a plea for the extension of individual instruction, but the report of a careful attempt to apply scientific technique to determine the effectiveness of instruction in the Winnetka schools. A single chapter presents the situation in Winnetka and the plan of instruction employed in its schools. The survey committee employed a series of tests in the skill subjects in the schools of Winnetka and also in three comparison schools. An analysis was made of the age-grade, mental-age, and group-classification data pertaining to the pupils. The freshmen scholarship records in high school were studied with reference to students, from Winnetka and other schools, who were attending the same high school. Controlled experiments in arithmetic and spelling formed a part of the survey study.

Achievement in "common essentials" receives the chief consideration in this report, although one chapter is devoted to "group and creative activities." The fact is interestingly brought out that to the latter division of instruction Winnetka children give 7 percent more of the school day than children in any of the schools in the vicinity. In reading, language, and arithmetic, the Winnetka pupils ranked high in the tests. Winnetka seems to require more outside work of its teachers than does the typical public school. But there is no grade repetition in Winnetka, and retardation is reported to be comparatively low. The school costs appear to be typical of neighboring schools.

Both in the presentation of data and in the summaries by chapters, facts are presented in a simple, direct manner whether they happen to be favorable or not to the Winnetka school. Much of the presentation is so free from technical or theoretical elements as to make the report quite readable even by those teachers whose training in scientific technique is rather limited. Other schools should find this study a valuable example of how to conduct a serious inquiry into the effectiveness with which the system, or some portion of it, is functioning.

F. P. O'BRIEN

University of Kansas

TERMAN, LEWIS M., AND OTHERS. *Mental and Physical Traits of a Thousand Gifted Children.* Stanford University, Stanford University Press, 1925, 648 pp. (Genetic Studies of Genius, Vol. I)

COX, CATHARINE M. *Early Mental Traits of Three Hundred Geniuses.* Stanford University, Stanford University Press, 1926, 842 pp. (Genetic Studies of Genius, Vol II)

Professor Terman and his collaborators in this initial volume of the "Genetic Studies of Genius" have set a high standard of scientific method for

the project. Their findings have significant value both as a presentation of the characteristics of gifted children and as a basis for the further study of the superior children in this group.

This is a psychological study of the most gifted children who could be found in the public schools of California. Something less than one child in two hundred could meet the standard set. An exhaustive study of 643 of these children—352 boys and 291 girls—was made including the racial and social origin, physical characteristics, school progress and achievement, interests and activities, and character and personality of each child. Comparisons are made with control groups and with well-established norms for unselected children.

The conclusions in many particulars run counter to popular concepts in regard to gifted children: the gifted children as a group are physically superior to unselected children; they walk, talk, and reach adolescence slightly earlier; "one-sidedness" as a characteristic of precocious children is mythical. Ninety percent of them surpass the average of the control group in strength of intellectual interests, which will surprise no one, but nearly as many are also superior in strength of social interests and in moral development. In activity interests the two groups are about equal.

It is fitting that in the second volume of this series the author should go back to the method of Galton, himself a pioneer both in the study of individual differences and of genius, which Woods has called "historiometry." With this Dr. Cox has combined a psychometric method. Three hundred eminent men born between 1450 and 1850 are studied. Objective data in regard to childhood (up to seventeen years) and youth (seventeen to twenty-six years) were collected. On the basis of these data each member of the group was given intelligence-quotient ratings by each of three persons experienced in testing children and adolescents, one rating for each period, or six in all. These ratings have no reference to the material achievement of the individual nor do they represent a rating on the true mental level of these young geniuses as some reviewers have seemed to infer.

The author's conclusions are:

1. "Youths who achieve eminence have, in general, (a) an heredity above the average and (b) superior advantages in early environment."
2. They "are distinguished in childhood by behavior which indicates an unusually high I.Q." and "the extraordinary genius who achieves the highest eminence is also the gifted individual whom intelligence tests may discover in childhood."
3. "Youths who achieve eminence are characterized not only by high intellectual traits, but also by persistence of motive and effort, confidence in their abilities, and great strength or force of character."

FRANCES N. MAXFIELD

Ohio State University

COOK, W. A. *High School Administration.* Baltimore: Warwick and York, 1926. 378 pp.

When, for the first time, the reviewer opened this volume, he was filled with a feeling of ennui. "Just one more book in school administration!" may be said fairly to have defined his reaction to the task of reading the book. A few pages, however, sufficed for a complete reversal of opinion, since, with plain, bold strokes and in a most interesting manner, the author introduces many cheerful moments into his work.

The point of view from which the book is written is essentially that of sheer common sense in high-school administration. It is quite evident, therefore, that the author understands the virtue of practicability and is quite willing that his pronouncements shall stand or fall upon that basis.

It seems to us that the chapter on discipline—yes, the author employs the term, and with a large *D* at that—is the peak of the volume. After reading it, we found our thoughts centering in such terms as "unique," "straightforward," "fearless," and "subversive of recent tradition," for here the author sets up a frontal attack upon this most troublesome of all questions, namely, pupil control. Doubtless there are many who will take exception to the point of view established in this chapter. But we submit that those whose spinal columns have been stiffened by the $CaCo_3$ of experience with this sort of thing will applaud the timely wisdom of the author's words. It will be recalled that there are yet others who are pleading for "a tincture of iron" in education today.

We venture the prediction that this volume will be generously received by those for whom it is intended. It is delightfully written. The author has quite succeeded in clothing his words with that quality called charm.

HARLAN C. KOCH

The University of Nebraska

TILTON, J. W. *The Relation between Association and the Higher Mental Processes.* New York, Teachers College, Columbia University, 1926. viii + 55 pp. (Teachers College, Columbia University, Contributions to Education, No. 218)

This study is an attempt to determine the relationship, if any, between association and the so-called "higher mental processes." The justification for such a study is to be found in the divergence of opinion among psychologists upon this subject. Some psychologists, notably Thorndike, hold that the two processes are identical, while others, including Bühler, Koffka, Terman, and Claparéde, insist that the two processes are more or less distinct. That these different conceptions exert a significant influence upon the selection of intelligence-test material and upon educational theory and practice, is self-evident.

The author tested subjects in association or habitual responses by means of vocabulary, information, and arithmetic-habit tests, and in relational thinking by means of completions, analogies, and arithmetic-power tests. He argues

that if a difference exists, "the association-test scores will differ more than the scores of one relational-thinking test differ from those of another."

Most psychologists would agree, as the author points out, that one type of human behavior cannot be sharply marked off from another. If we assumed that all responses, except purely instinctive reactions, differed from each other only in degree, and that all prior experiences were significant factors in the responses generally classified as novel, then it would be possible to get a significant difference by means of tests only if the association tests measured responses quite low down on the scale, and the so-called "power" tests measured responses relatively high on the scale. In other words, no sharp distinction could be expected in the scores of the tests, unless there was a sharp distinction in the type of tests used in the experiment. That the tests used were, in fact, sharply differentiated, is not apparent from the samples submitted. The value of the entire experiment turns upon this question, for, obviously, if the measuring stick is faulty, the results cannot be relied upon. We are told that the tests "are adequate in the opinion of Professor Thorndike [who does not believe that a difference such as the author seeks to measure, exists], of members of the advisory committee for this study, and of members of the seminar."

In conclusion, the author tells us that "we find in our data no clear evidence of *any* distinction—sharp or otherwise— between extent of association and the efficiency of the higher mental processes," and also that habitual responses are as good an index of intelligence as "ability to respond adequately to more novel test situations." Such a conclusion would be highly significant, if we could be certain as to what the tests tested. We must await further evidence on this point.

H. B. ALBERTY

Ohio State University

STRASHEIM, J. J. *A New Method of Mental Testing.* Baltimore, Warwick and York, Inc., 1926. 158 pp.

This is a difficult book to read and a difficult book to review. The terminology is needlessly novel and the presentation is cumbersome and even obscure. Dr. Strasheim is professor of educational psychology in the University of Stellenbosch, South Africa, but did the work here described in the laboratory of the University of London, which accounts for the foreword by Spearman.

In general, the book is devoted to the exposition of a certain view of "intelligence" and to the confirmation of this view by the application to a small number of dull and of bright children (dull and bright as estimated by teachers) of five sets of tests. The responses of the examinees—Dr. Strasheim calls them his "testees"—are reported minutely and then dissected to prove their corroboration of the logic of his definition of intelligence. The notion of intelligence here put forward is not new, but that advocated by Spearman (see his *Nature of 'Intelligence' and the Principles of Cognition*).

The tests employed are three so-called "situation tests," a maze-learning test, and the familiar cancellation test, all of which are, in the main, applied individually. The general arrangement of the test is such as to place the child in an imaginary situation, to give him a way of solving that situation, then to present variant situations—varied "fundaments," to speak technically, and to observe the degree of ability he shows in "educing" the salient "relations," that is, in finding and formulating the key to the series of solutions. Thus, the first tests involve the notion of drawing lots under variant conditions. The bright child perceives the essence of the lot-drawing situation; the dull child responds too concretely, too much from memory. The second set of tests involves the "eduction of an attributive relation" (method of smothering a fire, to be concrete). The third set of tests involves a sudden change in the series of situations, designed to accentuate the distinction between mere reproduction and satisfactory eduction. The fourth set of tests is a curious modification of the maze test, which involves the eduction by the child of the formula for finding the proper path, and which leads the author incidentally to inveigh against the crudity of the usual notion of "learning by trial and error." The fifth set of tests makes use of the cancellation of letters under complex instructions.

The gist of the author's argument, then, is that the essential differentiation between brightness and dullness lies in the ability of bright children to educe relations—or low or of high order—as against the employment of mere associative reproduction. Further, that only such tests should be employed as tests of intelligence as afford an opportunity for this process of eduction. There are numerous interesting attempts to apply some of the outcomes of the testing to problems of classroom teaching, particularly to the problem of the transfer of training, which he thinks can now be reformulated in terms of the eduction of relations.

American workers in the field of mental testing will find food for thought in this monograph, although they may be inclined to smile at the assertion that the period of life studied by the author (five to ten years) "is usually avoided by the mental tester," and at the further assertion that mental testing has not yet reached "that goal which it ought to have . . . . definite diagnosis and relatively certain prognosis."

GUY M. WHIPPLE

PAYNE, C. G., AND GEBHART, J. C. *Method and Measurement of Health Education.* New York, New York Association for Improving the Condition of the Poor, 1926. 43 pp.

This pamphlet contains a description of an experiment in health education conducted jointly by the School of Education, New York University, and the New York Association for Improving the Condition of the Poor, in Public School No. 106. Unfortunately, this school was suddenly abandoned in February, 1926, one year after the study began. The experiment was transferred to

another school, and it is hoped that a later pamphlet may give further results of the experiment.

The purpose was to determine "the degree and character of modification that could be made in the health practices of children included in the experiment" and also to determine "the changes that could be effected in the health practices of the community." A second purpose was to measure the changes brought about.

The authors follow this statement of the problem with a clear, forceful discussion of the need of the experiment and with a definitely proposed plan of procedure. These are set forth in a manner that convinces the reader that this was not a haphazard experiment conducted by impractical health enthusiasts.

The entire pamphlet is concise and well written. It is of distinct value to any teacher of children and is of especial value to the teacher concerned with the teaching of health education. The reviewer will await the further results of the experiment with keen anticipation.

C. C. McCracken

Ohio State University

PUBLICATIONS RECEIVED, DECEMBER 15 TO JANUARY 15

BOOKS FOR EDUCATIONAL EXECUTIVES

Doermann, H. J. *The orientation of college freshmen.* Baltimore, Williams & Wilkins, 1926. 162 pp. $3.00.

Gay, P.-H., and Mortreux, O. ed. *French elementary schools official courses of study.* Trans. by I. K. Kandel. New York, Teachers College, Columbia Univ., 1926. 270 pp. (Studies of the International Institute, no. 3)

Hall-Quest, A. L. *The university afield.* New York, Macmillan, 1926. 292 pp. $3.00.

Jones, W. B. *Job analysis and curriculum construction in the metal trades industry.* New York, Teachers College, Columbia Univ., 1926. 104 pp. (Contributions to education, no. 227) Cloth, $1.50. Paper, $1.25.

Maverick, L. A. *The vocational guidance of college students.* Cambridge, Mass., Harvard Univ. Press, 1926. 251 pp. (Harvard studies in education, no. 8) $2.50.

Noffsinger, J. S. *Correspondence schools, lyceums, chautauquas.* New York, Macmillan, 1926. 145 pp. $1.50.

Olsen, H. C. *The work of boards of education.* New York, Teachers College, Columbia Univ., 1926. 170 pp. (Contributions to education, no. 213) Cloth, $1.50. Paper, $1.25.

Shaw, R. T. *A study of the adequacy and effectiveness of the Pennsylvania school employes' retirement system.* Harrisburg, Pa., Pennsylvania State Education Assn., 1926. 159 pp. $.50.

Steele, R. M. *A study of teacher training in Vermont.* New York, Teachers College, Columbia Univ., 1926. 111 pp. (Contributions to education, no. 243) Cloth, $1.50. Paper, $1.25.

Whitney, F. L. *The growth of teachers in service; a manual for the inexperienced superintendent of schools.* New York, Century, 1927. 308 pp.

BOOKS FOR PSYCHOLOGISTS

Brown, A. W. *The unevenness of the abilities of dull and of bright children.* New York, Teachers College, Columbia Univ., 1926. 112 pp. (Contributions to education, no. 220) Cloth, $1.50. Paper, $1.25.

Thorndike, E. L., and others. *The measurement of intelligence.* New York, Teachers College, Columbia Univ., n.d. 616 pp.

BOOKS FOR TEACHERS AND SUPERVISORS

Cotteral, Bonnie, and Cotteral, Donnie. *Tumbling, pyramid building, and stunts for girls and women.* New York, A. S. Barnes, 1926. 143 pp. $1.60.

Easton, Donald. *A practical guide for teaching healthful living in the lower elementary grades.* Boston, Richard G. Badger, 1926. 130 pp. $1.75.

Granrud, John. *The organization and objectives of state teachers' associations.* New York, Teachers College, Columbia Univ., 1926. 71 pp. (Contributions to education, no. 234) Cloth, $1.50. Paper, $1.25.

Guiler, W. S. *A fourfold program of diagnostic and remedial instruction in punctuation; a teacher's manual.* Chicago, Rand McNally, 1926. 24 pp. Diagnostic test in punctuation. 18 exercises.

Hollis, A. P. *Motion pictures for instruction.* New York, Century, 1926. 450 pp.

Jones, A. J. *Education and the individual.* New York, Century, 1926. 225 pp. $2.00.

Ruch, G. M., and others. *Objective examination methods in the social studies.* Chicago, Scott, Foresman, 1926. 116 pp.

Schmitz, Sylvester. *Measurements in first year algebra; a study of their present status.* Washington, Catholic Education Press, 1926. 40 pp.

Sibila, Sister Theresa. *A teacher's handbook to accompany Deferrari's First Latin book for Catholic schools.* Washington, Catholic Education Press, 1926. 155 pp.

Smith, Milton. *The book of play production for little theaters, schools, and colleges.* New York, Appleton, 1926. 254 pp. $3.00.

Taeusch, C. F. *Professional and business ethics.* New York, Holt, 1926. 370 pp. $3.00.

BOOKS FOR HIGH-SCHOOL STUDENTS

Altholz, Nathaniel, and Klein, A. W. *Modern bookkeeping practice, first-year course.* Chicago, Lyons & Carnahan, 1926. 366 pp.

Bastian, G. C. *Graded exercises in news editing.* New York, Macmillan, 1926. 252 pp. $2.25.

Castillo, Carlos, and Montgomery, C. M. *Advanced Spanish composition.* Richmond, Va., Johnson Pub. Co., 1926. 182 pp. $1.40.

Chateaubriand, F. A. R. *Selections.* Ed. by Georges Roger. New York, Oxford Univ. Press, 1926. 138 pp.

Englehardt, Fred, and Haertter, L. D. *First course in algebra.* Philadelphia, Winston, 1926. 416 pp.

Form-room plays. Comp. by Evelyn Smith. New York, Dutton, n.d. Intermediate book. 220 pp. Junior book. 256 pp. Senior book. 253 pp. $.60 each.

Johnson, Alan, and Belcher, A. W. *Second course in algebra for secondary schools.* New York, Ambrose, 1926. 322 pp. $1.28.

Olmsted, E. W., and Sirich, E. H. *Beginners' French grammar.* New York, Holt, 1926. 292 pp. $1.60.

Palacio Valdés, Armando. *Marta y María.* Ed. by H. M. Martin. Boston, Ginn, 1926. 316 pp. $1.12.

Palacio Valdés, Armando. *Short stories.* Ed. by Albert Shapiro and F. J. Hurley. New York, Holt, 1926. 251 pp. $.96.

Treble, H. A., and Vallins, G. H. *Lyrical poetry.* New York, Univ. Press, 1926. First book. 96 pp. Second book. 95 pp.

BOOKS FOR JUNIOR HIGH-SCHOOL STUDENTS

Hamilton, M. A. *Greece.* New York, Oxford Univ. Press, 1926. 250 pp.

Taylor, C. R. *Vital English; advanced book.* New York, Ambrose, 1926. 361 pp. $1.04.

Trilling, M. B., and Williams, Florence. *A girl's problems in home economics.* Chicago, Lippincott, 1926. 314 pp. $1.40.

BOOKS FOR ELEMENTARY STUDENTS

Barrie, J. M. *Peter Pan and Wendy.* Retold by May Byron. New York, Scribner, 1926. 128 pp. $1.00.

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Batchelder, Mildred. *Topsy turvey tales.* New York, Scribner, 1926. 90 pp. $.60.

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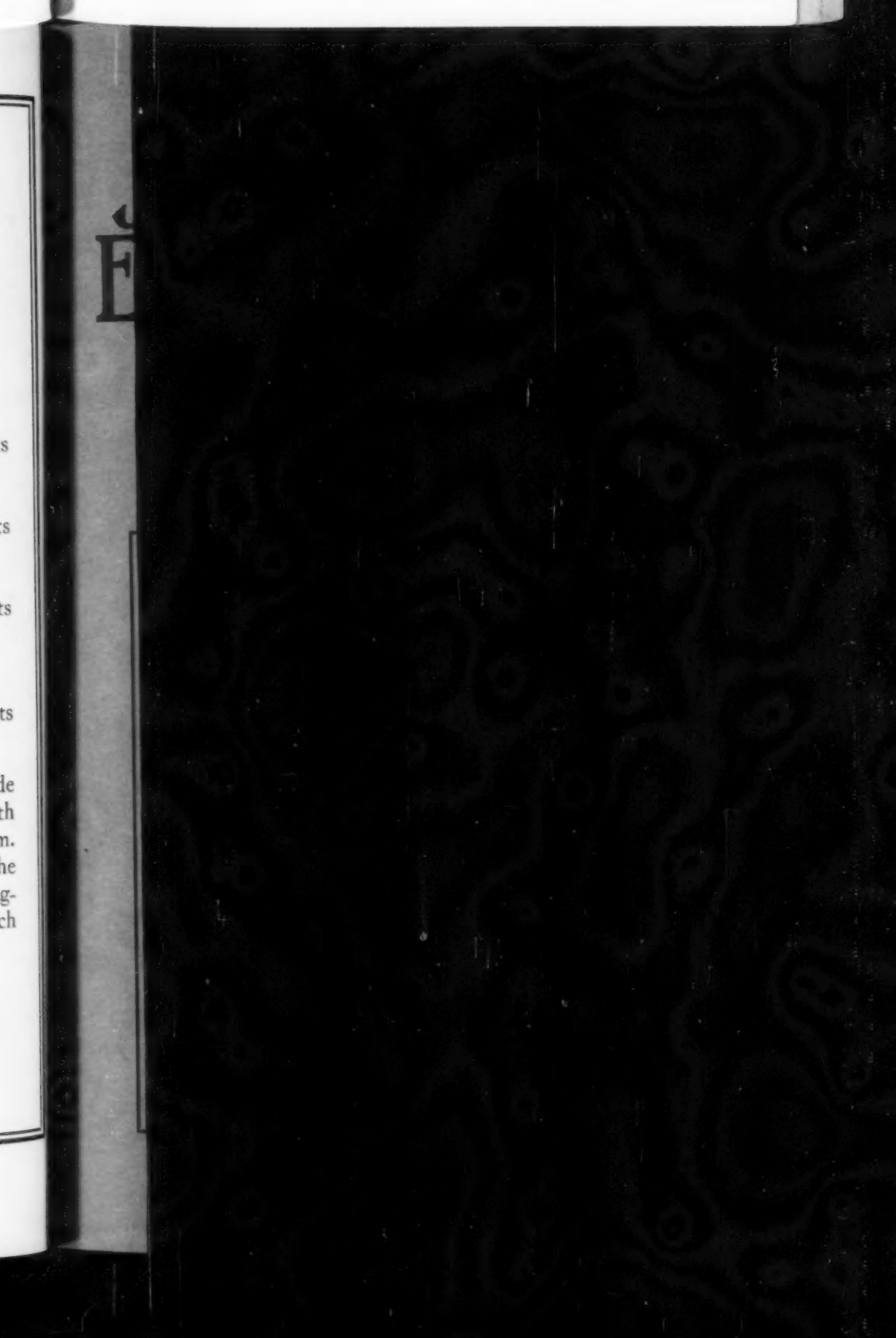
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